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ABSTRACT (Maximum 200 words)

The Final Proceedings for XVII International Conference on Coherent and Nonlinear Optics (ICONO 2001), 28 June – 1 July 2001.

This is a multi-disciplinary conference. Topics of discussion include fundamental aspects of laser-matter interaction, ultrafast phenomena, quantum and atomic optics, nonlinear optical phenomena, novel trends in nonlinear laser spectroscopy and optical diagnostics, physics of nanostructures, high-precision measurements in optics, laser in chemistry, biophysics and biomedicine, optical information processing and storage, strong laser fields and high field physics, nonlinear dynamics of optical physics.

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ICONO 2001

XVII International Conference on Coherent and Nonlinear Optics

Belarus Cultural Center
Minsk, Belarus, June 26–July 1, 2001
Technical Exhibit, June 28–30, 2001

ORGANIZED BY

National Academy of Sciences of Belarus (NASB)
Scientific Council on Optics and Laser Physics of the Russian Academy of Sciences (RAS)
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SPIE Russian Chapter (SPIE/Rus)
International Union of Pure and Applied Physics (IUPAP)
Optical Society of America (OSA)
European Office of Aerospace Research and Development (EOARD)

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Objectives and Scope

The 17th International Conference on Coherent and Nonlinear Optics (ICONO 2001) will be held on June 26–July 1, 2001, in Minsk, Belarus. The series of ICONO meetings was initiated in 1965 in Belarus as a First USSR Symposium on Nonlinear Optics. Among organizers was by now late world-known pioneer in nonlinear optics Rem Khokhlov, whose 75th anniversary we will celebrate in July 2001. Within 35 next years, ICONO became the largest conference in the former Soviet Union and Eastern Europe in the field of nonlinear and quantum optics, laser physics, and fundamental laser spectroscopy of atoms, molecules, and condensed matter. ICONO 2001 continues a tradition of these high-quality meetings. It provides an international forum to present the latest basic and applied research in the related fields. In addition to scientific sessions, ICONO 2001 will offer participants a technical exhibit and a program of short courses. The International Science and Technology Center (ISTC) Workshop will be arranged within the ICONO 2001 program, as well.

Technical Sessions

The ICONO 2001 technical program will include plenary sessions, keynote lectures, scientific sessions of invited and selected contributed oral presentations, and poster sessions. Postdeadline session will be organized, as well. A memorial session devoted to the 75th jubilee of Rem Khokhlov is planned during the conference.

The official language at the conference is English. No simultaneous translation service into Russian will be provided.

ICONO 2001 Topics

1. Fundamental Aspects of Laser–Matter Interaction

Nonlinear interactions of light with atoms and molecules • Multiphoton resonant processes • Photoionization and photodetachment • Nonlinear optics of plasma • Physics of nonlinear response of condensed matter • Laser-induced collective effects • Transient coherent phenomena.

2. Ultrafast Phenomena

Physics of ultrafast optical processes • Nonlinear optics of ultrashort pulses • Laser control of ultrafast phenomena • Ultrafast dynamics and optical interactions with condensed matter • Physics and applications of THz pulses.

3. Quantum and Atomic Optics

Quantum noise and statistics • Generation, properties, and applications of nonclassical light • Quantum information, quantum computers, and quantum computing • Cavity quantum electrodynamics • Laser control of atomic particle motion; cooling and trapping • Cooperative effects in a cooled atomic system; Bose-Einstein condensation • Atomic interferometry • Atomic microscopy • Interference phenomena in atomic systems.

4. Nonlinear Optical Phenomena

Nonlinear optical materials and their characterization • Frequency conversion • Strong optical nonlinearities • Multistability and chaos • Nonlinear wave dynamics • Light beams and pulses in nonlinear media • Resonant nonlinear phenomena • Nonlinear effects in waveguide structures • Spatial and temporal solitons.

5. Novel Trends in Nonlinear Laser Spectroscopy and Optical Diagnostics

Novel concepts in laser spectroscopy • Nonlinear spectroscopy of high resolution and high sensitivity • Time-domain, frequency-domain, and coherent spectroscopy • High-precision femtosecond spectroscopy • Nonlinear optical diagnostics.

6. Physics of Nanostructures

Laser-induced effects: phase transitions, instabilities, and self-organization • Quantum-size effects • Photonic bandgap structures • Laser diagnostics of nanostructures • Ultrafast microstructuring.

7. High-Precision Measurements in Optics

Laser interferometry • Absolute optical frequency measurements and fundamental laser metrology • Measurements with ultrahigh resolution • High-precision laser measurements in fundamental physics.

8. Lasers in Chemistry, Biophysics, and Biomedicine

Chemical and biological photoinduced processes • Ultrafast phenomena in chemical and biological systems • Molecular dynamics and quantum control • Nonlinear optical properties of biological materials and chiral media • Fundamentals of laser medicine • Optical imaging and optical tomography.

9. Optical Information Processing, Transmission, and Storage

Associative data processing • Optical switching and neural technologies • Physical principles of optical data writing, storage, retrieval, and transmission.

10. Strong Laser Fields and High Field Physics

Atoms, molecules, and clusters in strong light fields • High-temperature plasma, laser-driven hard x-ray emission, and production of superthermal electrons • Amplification and generation of short-wavelength radiation • X-ray nonlinear optical sources • Laser-plasma nuclear excitation and strong-field QED • Harmonic generation and propagation effects.

11. Nonlinear Dynamics of Optical systems

Temporal, spatial and spatio-temporal behavior of optical systems including lasers • Multistability and chaos • Polarization instabilities, symmetry-breaking, and chaos • Quantum chaos in optical systems • Control of bifurcations and complex behavior • Synchronization of periodic and chaotic dynamics • Spatio-temporal structures including localized structures.

12. SYMPOSIUM on Entangled States

13. SEMINAR on Nonlinear Materials

Postdeadline Papers

The purpose of postdeadline papers is to give participants the opportunity to hear new and significant material in rapidly advancing areas. Only those papers judged to be truly excellent and compelling in their timeliness will be accepted. Papers must reach the Program Committee **not later than June 5, 2001**. Authors of postdeadline papers must submit a cover letter indicating the significance of the contribution, camera-ready copies of abstract and summary with the below-listed requirements.

Preparation of Abstract and Summary

Each author is requested to submit camera-ready copies of a 35-word abstract and one complete page summary of the paper and one set of the copies of all the materials along with filled in paper categorization form. Both abstract and summary should be typed with a 12pt size; TimesNewRoman typeface is preferable.

A 35-word abstract is typed or printed in English one and half spaced on a separate sheet and arranged with the title at the top of the page. Below the title, type the author's name, affiliation, complete return address, telephone/fax number, and e-mail address, and the body of abstract. In case of multiple authors from different institutions, each author's name and address should be listed separately after the title.

A summary of the presentation (one complete page, including figures, tables, and references) is typed or printed in English one and half spaced within 15 cm x 22 cm rectangular area. The summary must include the title (centered, capitalized) at the top of the page, followed by the author's name(s), affiliation(s), complete return address(es) (centered), and the body of the summary. The abstract should not be repeated. Because contributed papers will be selected on the base of the summary, it should be informative and succinct, not descriptive. All figures have to be reduced to a maximum 5 cm wide and to be inserted in the text. Use black ink, white paper. Do not use asterisks, acknowledgments, and footnotes. Cite references at the end of the summary.

Submission of Papers

Camera-Ready Paper Submission

Fill in Paper Categorization Form (see below) and mail it along with your paper(s) and one copy of all the materials to the ICONO 2001 address. Please note that faxes will not be accepted. Use the following as a checklist for your camera-ready paper submission:

- ☐ Paper must be received by June 5, 2001
- ☐ 35-word abstract must be typed in English one and half spaced on a separate sheet of paper
- ☐ Summary (one complete page) must be typed in English one and half spaced within 15x22 cm rectangular area
- ☐ One additional set of copies of all the materials must be submitted

All Camera-Ready Paper submissions are to be addressed to:

Prof. Victor Zadkov
Faculty of Physics and International Laser Ctr.
M. V. Lomonosov Moscow State University
Moscow 119899, Russia

Electronic Submission Papers

Alternatively, you may submit abstract&summary of your paper electronically via our website. To do this, please fill in Electronic Paper Categorization Form (follow instructions there). If you need to submit several papers, submit each of them separately. Camera-Ready Submission must not duplicate electronic Submission Papers.

For Electronic Submission Papers we can only use files formatted in TeX/LaTeX and MS Word. Abstract and Summary of your paper should be in separate files. All textual material of the Summary (including tables, captions, etc.) should be in electronic form, as a single file. Figures transmitted electronically should be in PostScript. PostScript figures presented in clearly labeled separate files should be archive (by TAR, PKZIP, or ARJ utilities) into one archive file. Submit only archive file (do not submit separate PostScript figures files). Every file in the submitted archive should print correctly when sent to our PostScript printer (the standard 35 fonts are available).

To submit paper(s) via the World Wide Web follow instructions at the ICONO 2001 web site at http://www.ilc.msu.su/icono/icono.html. If you have problems, email to icono@comsim1.phys.msu.su.

Conference Publications

Advance Program and Technical Digest

Abstracts and summaries of all the accepted papers (both oral and poster) will be published in Advance Program and Technical Digest, respectively, and provided to the participants in the registration packet. Postdeadline abstracts and summaries will not be published.

Conference Proceedings

ICONO 2001 will result in published by the SPIE (The International Society for Optical Engineering) Proceedings that can be ordered through the Advance Technical Program. We request that full texts of all oral or poster presentations included in the conference Program are to be submitted in the Conference Proceedings. To ensure high-quality Proceedings, all manuscripts will be reviewed by the Conference Program Committee and Proceedings editors for technical merit and content. Camera-ready manuscripts are required and must be submitted in English due date. Late manuscripts run the risk of not being published. Copyright to the manuscript is expected to be released for publication in the Proceedings of SPIE. Papers published are indexed in leading scientific databases including INSPEC, Compendex Plus, Physics Abstracts, Chemical Abstracts, International Aerospace Abstracts, and Index to Scientific and Technical Proceedings. For the instructions on the manuscript preparation for the SPIE Proceedings see the Author Guidelines at http://www.spie.org.

Note: *If an author does not attend the meeting and make a presentation, the editor may choose not to publish the author's manuscript in the conference proceedings.*

Conference Web Site

Welcome to the conference web page at

http://www.ilc.msu.su/icono/icono.html

With ICONO 2001 web site, find all the needed information, look for the conference news, submit your paper(s) on-line, and ask your questions.

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Technical Exhibit

Following the success of the ICONO'98 Technical Exhibit, first in the series of ICONO conferences, we will organize a Technical Exhibit in the frame of the ICONO 2001, as well. It will serve to introduce new products and services to the participants and guests of the conference. All companies and institutes who are interested in advertising their products and services are greatly welcomed at the ICONO 2001 Technical Exhibit. Please, request for more information the Exhibit Committee.

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ISTC Workshop

Within the frame of ICONO 2001 program will be arranged the International Science and Technology Center (ISTC) Workshop. It will cover ISTC activities in both Russia and Belarus in the field of laser physics and nonlinear optics. ISTC Workshop program includes several invited lectures, describing the ISTC activities and delivered by the ISTC staff, and brief presentations (oral and poster) from the ISTC projects participants.

Contact:

Prof. L. N. Orlov
B. I. Stepanov Institute of Physics
National Academy of Sciences, Minsk, Belarus
Tel: 375(17)284-04-32; Fax: 375(17)284-08-79
E-mail: orlov@dragon.bas-net.by

Welcome to Minsk

Belarus is located near the geographical center of Europe having common borders with Russia in the east, with Ukraine in the south, with Poland in the west and with Lithuania and Latvia in the north. The territory covers distance of 560 km from north to south and 650 km from west to east. The country's population is 10.3 million people. Belarus is one of the founders of the United Nations Organization (1945).

Minsk is the capital of Belarus. First mentioned in the documents in 1067, it passed through many historical trials and political collisions. At present, Minsk is a modern city with population about 2 million people, political, cultural and scientific center of the country. In Minsk are located more than 50 research and educational institutions, National Academy of Sciences, Belarusian State University, and Polytechnic Academy inclusive. Optical, electronic, and automobile industries well developed in Belarus are presented in Minsk by a number of big plants and corporations.

During the Conference, guests will have opportunities to enjoy Belarusian art and culture. Opera and Ballet Theatre, National Museum, National Art Museum, a number of concert halls, art galleries, open air museums of traditional architecture, lifestyle, and crafts will be a part of social program. Most of the city architecture is related to the second half of the last century with a few nice cathedrals built in the XVIIth century.

More information about Belarus and Minsk can be found at http://www.ac.by.

Travel in Minsk

By air: Minsk can be reached by air via London, Frankfurt, Berlin, Roma, Warsaw, Moscow, St-Petersburg, and Kiev.

By rail: Direct international express and intercity trains operate between Belarus and most European countries. Comfortable night trains are available from Moscow, St-Petersburg, and Kiev.

Climate: Moderately continental, average temperature in June–July is about 22º C.

Time Zone: GMT+2 hrs.

Entry Formalities: A valid international passport and an entry visa are required for most countries.

Customs regulations: There is no limitation in bringing the foreign currency in Belarus.

Currency: The Belarusian rubles. Currency exchange offices are available in any international hotel.

Credit Cards: At most hotels, restaurants, and supermarkets VISA, MASTER CARD, and AMERICAN EXPRESS are welcome.

Electricity: AC 220 V, 50 Hz.

Visa Support

A valid passport and visa are required to entry into Belarus. The Organizing Committee will arrange visa support, if necessary, provided applications are made at least one month in advance. Questionnaire for arranging visa support is given below:

1. Your exact office address and contacts (phone, fax, and email).
2. Passport number, when and where issued and till which time is valid.
3. Citizenship
4. Planned dates of visit to Belarus (indicate them with a jitter)
5. If you have accompanying persons on the planned trip, please provide the same information for all of them.

Please fill it in and email (fax) to the conference address.

Note that if you plan to visit Russia in connection with the ICONO-2001, you will need Russian visa, as well.

Hotel Reservation

Below you may find short description of hotels listed in the Hotel Reservation Form. All of them are well located in the downtown.

Planeta

Masherova 31, tel. (+375-17) 226 78 53/223 85 87, fax (+375-17) 226 77 80. 311 rooms. Choose business class

rooms with a classic aesthetic or sleep in a clean, old-style room. Popular with business travellers. Just a 10-minute walk to metro Nemiga.

Belarus

Storozhevskaya 15, tel. (+375-17) 239 17 05/234 82 52, fax (+375-17) 239 12 33. 1,000 beds. Metro: Nemiga. Upscale in taste and amenities, but still not "western". Right in the heart of the commercial district.

Orbita

Pushkina 39, tel. (+375-17) 252 39 88, 252 32 08, fax (+375-17) 257 14 20. 216 rooms. Metro: Pushkinskaya Reception ladies are cordial, decor is new, price—right. Stay here. Change money, phone home, sleep. The economy doubles (with bathtubs) are perfect for backpackers.

Yubileynaya

Masherova 19, tel. (+375-17) 226 90 24, fax (+375-17) 226 91 71. 247 rooms. Catering to business travelers, this hotel hides a rather refined interior inside of its ugly concrete shell.

For more information on hotels in Minsk, please go to the web page at www.inyourpocket.com and then click Belarus and finally select hotels in Minsk.

All hotel reservations will be made on the "first come, first served" basis. The Organizing Committee reserves the right to alter the reservation if the preferred hotel choice is no longer available.

Bus transportation will be provided every morning from the hotels to the conference venue during the meeting.

Student Travel Grants

A limited number of travel grants will be available for students whose papers will be accepted for the presentation at the conference. Application deadline is May 30, 2001.

Conference Venue

The ICONO 2001 conference will occupy Belarus Cultural Center located at the bank of Svisloch river, near Pervomaiskaya metro station (Oktyabr'skaya str. 5) in 3 to 5 minutes walking distance.

Contacts

Prof. Victor Zadkov
Faculty of Physics and International Laser Center
M.V.Lomonosov Moscow State University
Moscow 119899, Russia

Phone: +7 (095) 939-1225
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e-mail: icono@comsim1.ilc.msu.su
http://www.ilc.msu.su/icono/icono.html

ICONO 2001 REGISTRATION FORM

SECTION A: Badge Information

Last (Family) Name

First (Given) Name | Middle Initial

Professional Affiliation/Institution

Department

Street Address

City | State | Zip Code

Country

Telephone with Area Code | FAX with Area Code

E-Mail address

SECTION B: Registration Fees

The registration fee includes admission to all ICONO 2001 technical sessions, plenary and key-note lectures, one copy of technical digest and exhibit catalog, admission to the conference reception and admission to the technical exhibit.

	Before May 30, 2001	**After May 30, 2001; at the Meeting**
Regular and invited participants, members of the Program Committee and Advisory Board	☐ 300USD	☐ 340USD
Student	☐ 20USD	☐ 20USD

Payment Information

Please register only one person per form. This form can be copied for additional registrants. Registrants can pay only by bank draft or cash.

Payments by bank draft

All payment must be made in US dollars or in Euros. Please indicate that the payment is the organizing fee for the ICONO 2001 conference, plus your name (or names of the persons you are paying for). All bank expenses must be made by the sender. Please confirm your bank draft by sending us a copy of bank papers. Payments should be made to:

Beneficiary: Institute of Physics, National Academy of Sciences of Belarus
Account # 3622023065015

Bank of Beneficiary: Joint-Stock saving Bank "Belarusbank"
S.W.I.F.T. code: AKBBBY2X
Branch 508 in Minsk, code 610

Payments in US dollars can be made through the following Correspondent Bank:
American Express Bank, Ltd. (New York)
S.W.I.F.T. code: AEIBUS 33
National ID: CHIPS ABA: CP0159; FED ABA: FW 026002053

Payments in Euros can be made through the following Correspondent Bank:
American Express Bank, GmbH (Frankfurt am Main)
S.W.I.F.T. code: AEIB DE FX
National ID: BLZ: BL 51230500

Refund policy for preregistration: There will be a $20 service charge for processing refunds. A letter requesting the refund should state the preregistrant's name and to whom the check should be made payable. NO REFUNDS WILL BE ISSUED AFTER JUNE 15, 2001.

Please return this form by airmail or fax with a copy of your payment papers to:

Dr. Alexander Nizovtsev
ICONO 2001 Organizing Committee
Institute of Physics, NAS
F. Skaryna ave. 70, Minsk 220602
Belarus

FAX: +375(17)284-08-79
E-mail: apniz@dragon.bas-net.by

ICONO 2001 HOTEL RESERVATION FORM

SECTION A: Participant Information (only one participant per form)			
First Name		Last Name	
Title		Organization/Institute	
Department			Male
Street Address			Female
Postal code and City		Country	
Telephone		Telefax	
E-mail		Citizenship	
Passport number	Valid till	Date of birth	
Accompanying person(s)			

SECTION B: Arrival and Departure Information		
Arrival date		Flight No.
Departure date		

SECTION C: Hotel Reservation			
List of Hotels	Your preference	Room type and price per night per room	
Planeta		☐ Single room $55	☐ Dbl room $60
Belarus		☐ Single room $46–80	☐ Dbl room $60–90
Yubileynaya		☐ Single room $55–80	☐ Double room $65
Orbita		☐ Single room $60	☐ Double room $45
Check-in date	___2001	Check-out date	_____ 2001
Special requests concerning accommodation			
I wish to share room with			

Payment Information

This is only RESERVATION form to book your hotel by the Organizing Committee. You will pay directly to the hotel upon your arrival in Minsk.

Please return this form by airmail or fax with a copy of your payment papers to:

Dr. Alexander Nizovtsev
ICONO 2001 Organizing Committee
Institute of Physics, NAS
F. Skaryna ave. 70, Minsk 220602
Belarus

FAX: +375(17)284-08-79
E-mail: apniz@dragon.bas-net.by

ICONO 2001 PAPER CATEGORIZATION FORM

1. Select a conference section you submit your paper to (subject to change by the Program Committee)

- ☐ 1. Fundamental Aspects of Laser–Matter Interaction
- ☐ 2. Ultrafast Phenomena
- ☐ 3. Quantum and Atomic Optics
- ☐ 4. Nonlinear Optical Phenomena
- ☐ 5. Novel Trends in Nonlinear Laser Spectroscopy and Optical Diagnostics
- ☐ 6. Physics of Nanostructures
- ☐ 7. High-Precision Measurements in Optics
- ☐ 8. Lasers in Chemistry, Biophysics, and Biomedicine
- ☐ 9. Optical Information Processing and Storage
- ☐ 10. Strong Laser Fields and High Field Physics
- ☐ 11. Nonlinear Dynamics of Optical Systems
- ☐ 12. Symposium on Entangled States

2. Presentation type (subject to change by the Program Committee)

☐ Oral only ☐ Oral preferred ☐ Poster preferred

3. Title

_____

4. Authors _____

5. Corresponding author

Title: ☐ Dr. ☐ Prof. ☐ Ms. ☐ Mrs. ☐ Mr.
First Name: _____
Middle: _____
Last Name: _____
Department: _____
Organization: _____
Street Address: _____
City: _____
State/Province: _____
Zip/Postal: _____
Country: _____
Fax: _____
E-mail: _____

6. Audio-Visual Equipment (please specify for oral presentations only)

_____

ICONO 2001
SHORT COURSES

All short courses are in Hall 6
Belarus Cultural Center, Minsk, Belarus

ICONO 2001 Short Courses Schedule

	June 27 Wednesday	June 28 Thursday	June 29 Friday	June 30 Saturday
8:30–10:30	**#404** **MOI**	**#403** **PRASAD**	**#401** **RIEDLE**	**#201** **ZADKOV**
10:30–12:30				**#203** **RUBINOV**
12:30–14:00	LUNCH	LUNCH	LUNCH	LUNCH
14:00– 16:00	**#405** **MESCHEDE**	**#402** **SVANBERG**	**#204** **ZHELTIKOV**	
16:00– 18:00			**#202** **YABLONSKII**	

Short Courses List

Four-Hour Courses

#401 Generation, Characterization, and Spectroscopic Application of 20 fs Pulses Tunable from the UV to the NIR, Eberhard Riedle
#402 Laser Spectroscopical Applications to Environmental and Medical Research, Sune Svanberg
#403 Biophotonics, Paras Prasad
#404 Kinetic Effects of Light on Atoms and Molecules, Luigi Moi
#405 Experiments with Single Atoms, Dieter Meschede

Two-Hour Courses

#201 Quantum Computers and Quantum Computing: Dreams and Reality, Victor N. Zadkov
#202 Quantum Well Heterostructures Based on Wide Band-Gap Semiconductors, Gennadii P. Yablonskii
#203 Site Selective Spectroscopy of Fluorescent Probes in Solutions and Biological Membranes, Anatoly N. Rubinov
#204 Introduction to Photonic Crystals, Alexei M. Zheltikov

Selected short courses for review and professional advancement, supplementing the technical sessions, will be held in conjunction with the conference. The courses are instructed by the experts in their fields. The list of instructors includes nine of key ICONO 2001 invited speakers who will deliver four- or two-hour short courses in English.

The ICONO 2001 Short Courses are FREE for the conference participants.

Short Courses Contacts

Dr. Svyatoslav A. Shlenov
Manager, ICONO 2001 Short Courses Program
International Laser Center and Faculty of Physics
M.V.Lomonosov Moscow State University
Vorob'evy Gory, Moscow 119899
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Dr. Vyacheslav N. Chizhevskii
Manager, ICONO'2001 Short Courses Program

Phone: (375-17)284-26-58
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#401
Generation, characterisation and spectroscopic application of 20 fs pulses tunable from the UV to the NIR

Eberhard Riedle, *LS für BioMolekulare Optik, Ludwig-Maximilians-Universität München, Germany*

Noncollinearly phase matched optical parametric amplifiers (NOPAs) pumped by the frequency doubled output of kHz Ti:sapphire regenerative amplifier can produce widely tunable visible pulses. The spectral width of these pulses is sufficient to support sub-10 fs lengths, with simple prism sequences compression to below 20 fs is readily achieved. Output energies from a two-stage NOPA are as high as 20 μJ. The NOPA can also be operated in the near infrared up to a wavelength of 1.7 μm. Efficient frequency doubling leads to pulses with a wavelength down to below 250 nm and lengths of about 25 fs.

The theoretical background of NOPAs and details of the implementation will be explained. It will be discussed how these pulses can be characterized during daily operation. This includes the synchronous operation of two independent NOPAs to obtain a fully tunable two-color spectrometer. Typical applications of this spectrometer are the measurement of the ultrafast reactive dynamics of molecules and the observation of vibronic wavepackets. The result of prototype investigations will be presented and the experimental signature of various intramolecular processes will be discussed.

Eberhard Riedle was trained as a physicist at the Ludwig-Maximilians-Universität München. He obtained his PhD at the Technische Universität München for Doppler-free spectroscopy of large molecules in 1984 and his "Habilitation" for ultrahigh resolution spectroscopy of molecules and clusters and molecular dynamics in 1991. He then spent 18 months as a visiting fellow at JILA, University of Colorado at Boulder, USA. In 1993 he was appointed department head for femtosecond spectroscopy of condensed matter at the Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie in Berlin. Since 1996 he is associate professor for experimental physics at the Ludwig-Maximilians-Universität München and works both on the generation of tunable ultrashort pulses and the investigation of ultrafast reactive dynamics in molecules.

#402
Laser Spectroscopical Applications to Environmental and Medical Research

Sune Svanberg, *Lund University, Lund, Sweden*

Laser spectroscopy provides powerful means for highly selective and sensitive analysis and diagnostics. Absorption, fluorescence or scattering features of atoms and molecules are employed. Measurements can be made on samples locally or remotely. Examples from environmental monitoring and medical diagnostics will be given. Environmental monitoring includes air pollution studies at industries as well as at geophysical sources, such as geothermal fields and volcanoes. Further, by using laser-induced fluorescence, vegetation status and the deterioration of building facades can be assessed. Medical diagnostics covers malignant tumour detection and atherosclerotic plaque studies using laser-induced fluorescence in point-monitoring and imaging modes. Photodynamic therapy is an example of laser-induced chemistry for tumour eradication. With a rapid development in the fields of diode lasers, fibre optics, detector technology and computer systems, laser spectroscopic techniques are entering more and more real-world applications.

Sune Svanberg received his PhD in 1972 from the Goteborg University, Sweden. Since 1980 he is a professor and division head at the Lund Institute of Technology. He is also the director of the Lund Laser Center, a European Large Scale Infrastructure. He has more than 400 publications in atomic laser spectros-

copy, high-power laser-matter interaction, combustion diagnostics, environmental monitoring and medical laser applications. He is a member of several academies and received two honorary doctorates.

#403
Biophotonics

Paras N. Prasad, *Institute for Lasers, Photonics, and Biophotonics, The State University of New York at Buffalo, USA*

Scientific and technology breakthroughs in the 21st Century are more likely to occur at the interfaces of disciplines. Biophotonics is defined as the interface of photonics or lightwave technology, and the biological sciences. It is a new frontier, offering tremendous prospects for optical diagnostics as well as for light activated therapy, surgery, biosensing and restoration of biological functions. The course will include the following topics:

- Photobiology: Interaction of Light with Cells; Interaction of Light with tissues; Nonlinear Optical processes with Intense Laser beams; Photo-Induced Effects in Biological Systems.
- BioImaging: Various imaging techniques; fluorescent markers; cellular imaging; imaging of soft and hard tissues; in-vivo imaging; dynamic imaging.
- Optical diagnostics: Fluorescence immunoassay; Flow cytometry.
- Light activated therapy: Photodynamic therapy; Low-level light therapy.
- Nanotechnology: Application of nanoprobes; NEMS.
- Tissue engineering: Use of short pulse lasers for tissue welding; Tissue contouring; Tissue regeneration.

Paras N. Prasad is the Executive Director of the Institute for Lasers, Photonics and Biophotonics. He is a Distinguished Professor of Chemistry, Physics, Medicine and Electrical Engineering, the highest rank in the New York State university system. He also holds the Samuel P. Capen Chair at the University at Buffalo. Dr. Prasad has published over 400 scientific papers, co-edited 5 books and co-authored a monograph, on nonlinear optics, which is widely used as a textbook and a reference source. The Institute for Lasers, Photonics and Biophotonics has a very comprehensive program headed by Professor Prasad, which involve Physicists, Chemists, Engineers, Medical doctors, Dentists and Biomedical researchers. For his pioneering contributions, Dr. Prasad has received much recognition. He is a Fellow of the American Physical Society and a Fellow of the Optical Society of America. He is also a recipient of the prestigious Sloan and Guggenheim fellowships. He has received the Schoellkopf Award of the Western New York American Chemical Society and Technology/Discovery Award of Western New York Health Care Industries, for his academic achievements as well as for his work emphasizing University-Industry vital partnerships. Driven by his commitment to innovation and technology transfer. Professor Prasad established high-tech companies, Laser Photonics Technology, Inc. (LPT), Hybrid Materials, and Advanced Cytometry Instrumentation Systems (ACIS) in Amherst, New York.

#404
Kinetic Effects of Light on Gases and Atoms

Luigi Moi, *University of Siena, Siena, Italy*

The short course will be devoted to the presentation of the kinetic effects induced by light on gases, atoms, ions and molecules. Laser cooling and trapping are the most interesting and well-known applications of forces exerted by light on matter and a short review of the most significant experimental results will be presented with some attention to the utilization of non-monochromatic lasers. Light can also modify the transport properties of a gas and the experimental efforts made in this field will be discussed. In particular, the resonance radiation pressure on gases, the light-induced drift and the light induced atomic desorption effects will be introduced and the main experimental results described.

Luigi Moi received his Ph.D. in Physics from the University of Pisa, Italy, in 1978. He has been researcher of National Research Council (CNR) at Institute of Atomic and Molecular Physics in Pisa. In 1990 he joined as full professor the University of Siena, Italy, where he is leading a research group on laser spectroscopy and atomic physics. He has been Director of the Physics Department of the Siena University (1990–1996), Director of the UdR of the Istituto Nazionale di Fisica della Materia –INFM– of Siena (1990–2001) and member of the Consiglio Direttivo INFM (1990–2001). Since 1999 he is member of the Academic Senate of the Siena University. He is member of the Atomic and Molecular Division of the EPS. He has been visiting professor at: Ecole Normale Superieure, Paris-France; YALE University, New Haven, USA; Laboratoire Aime Cotton, Orsay, France; Universite' Paris Nord, France. His current research interests include the fields of atomic and molecular laser spectroscopy, coherent population trapping, light-induced atomic desorption (LIAD), laser cooling of atoms and ions, magneto optical traps (MOT) of radioactive atoms.

#405
Experiments with Single Atoms

Dieter Meschede, *Institüt für Angewandte Physik, Universität Bonn, Germany*

The first part of this short course will describe experimental efforts to control single microscopic particles such as atoms, ions, or molecules, which are dominated by the methods of laser cooling and trapping. Single particles at rest are objects of choice for precision spectroscopy, for demonstrations of fundamental quantum effects, which are usually described in terms of single particle situations. More recently

controlled atomic systems have become a prime candidate for implementations of quantum processing.

Dieter Meschede received his Ph.D. in Physics from the Ludwig-Maximilian-University of Munich, Germany in 1984. He has been assistant professor of physics at Yale University, New Haven, USA, senior scientist at the Max-Planck-Institute for Quantum Optics, Garching, Germany, and professor of physics at the University of Hannover, Germany. In 1994 he joined the University of Bonn where he is since leading a research group on laser and atomic physics. His current research interests include the fields of precision spectroscopy, lasercooling, and atom lithography.

#201
Quantum Computing and Quantum Computers: Dreams and Reality

Victor N. Zadkov, *M.V.Lomonosov Moscow State University, Moscow, Russia*

Quantum computers operating in the Hilbert space require quantum logic fundamentally different from classical Boolean one. This difference in combination with huge capacity of Hilbert space leads to a great efficiency of quantum computations over its classical counter-part in several applications, namely, cryptography (Shor algorithm), searching an unsorted database (Grover algorithm), and simulation of a quantum system's dynamics. In this review the basics of quantum computation, including construction of basic gates and quantum networks are explained. The power of quantum algorithms is illustrated and physical implementations of quantum computers are analyzed. Among leading experimental embodies discussed are the NMR-based quantum computer, linear ion-trap, and surface nanostructures realizations. It is stressed that the main obstacle to build an actual quantum computer is the decoherence problem, which may be circumvented with the help of quantum error correction methods.

Victor Zadkov is a Professor of Physics in the Faculty of Physics, M. V. Lomonosov Moscow State University. He received his M.S. and Ph.D. degrees in Physics (Mentors: Profs. S. A. Akhmanov and N. I. Koroteev) from the same University in 1981 and 1984, respectively. Since 1991 Victor Zadkov is a Vice-Director of the International Laser Center and since 2000 — a Vice-Dean of Physics, M. V. Lomonosov Moscow State University. Victor Zadkov's current research interests are in the field of laser physics, interaction of laser radiation with matter, molecular dynamics of photoexcited molecules, physics of molecules and atoms in superintense laser field, quantum information and quantum computing, and computer simulation. Victor Zadkov is an author of more than 150 scientific publications including a book and several collections edited. He is a member of IEEE and SPIE, serves as an editorial board member for Computers in Physics series (Nauka Publishers, Moscow), a scientific adviser of Physics Encyclopedia (Russian Encyclopedia Publishers, Moscow), a member of the Council of the International Laser Center, Scientific Council of the Department of Physics, and Council of Moscow State University. Victor Zadkov is a Program Committee and International Advisory Board member for many International Conferences and Symposia (International Conference on Coherent and Nonlinear Optics, International Conference on Laser Applications in Life Sciences, German-Russian Laser Symposium, and many others). In 1984 Victor Zadkov was awarded by the Lenin Komsomol Prize in Physics (the highest award for young scientists in the Former Soviet Union). In 1997 he received a fellowship from Alexander von Humboldt Foundation (Bonn, Germany).

#202
Quantum Well Heterostructures Based on Wide Band-Gap Semiconductors: Lasers and Nonlinear Optical Properties

Gennadii P. Yablonskii, *Stepanov Institute of Physics, National Academy of Sciences, Minsk, Belarus*

Quantum well heterostructures based on wide band gap semiconductors are widely used now for production of laser and spontaneous light emitting devices operating from near UV up to red spectral regions. The devices found their applications for different communication and TV systems, medical appliances, computer technique, light emitting displays, traffic signs, non-linear modulators and switchers.

MOVPE and MBE growth technology, design of different type heterostructures based on ZnMgSSe and In(Al)GaN compounds, a comparison of the energy spectrum, optical and electrical properties, excitonic states, laser parameters, gain and energy transfer mechanisms of the bulk crystals and quantum well heterostructures will be given in the first part of the lecture.

The second part will be devoted to description of the ZnSe and GaN based laser and light emitting diodes, optically and electron beam pumped transverse and vertical cavity lasers in the spectral region from 360 nm up to 530 nm. Non-linear effects and devices (free exciton bleaching and Mott transition, second harmonic generation, quantum Stark effect) will be also included.

Gennadii Yablonskii was trained as physicists at the Grodno State University and at the postgraduate course at the Institute of Physics of Belarus Academy of Sciencies. He received his PhD at the Vilnius University in 1976 for optical and laser properties of the ZnSe mono-crystals. His "Habilitation" thesis devoted to influence of the high laser irradiation and electric field on optical properties of semiconductors was

defended at the Belarus State University in 1995. He is an associate editor of the Journal of Applied Spectroscopy. In 1996 he received professor certificate and the position of the main scientific associate of the Institute of Physics of Belarus Academy of Sciencies. During last six years his group is engaged together with German colleagues from Institute für Halbleitertechnik RWTH Aachen and firm AIXTRON AG, Aachen in investigations of luminescence, optical and laser properties of the ZnSe and GaN epitaxial layers, ZnMgSSe/ZnSe and InGaN/GaN MOVPE grown quantum well heterostructures.

#203

Site Selective Spectroscopy of Fluorescent Probes in Solutions and Biological Membranes

Anatoly N. Rubinov, *Stepanov Institute of Physics, National Academy of Sciences, Minsk, Belarus*

It will be shown that the combination of Red Edge Excitation Spectroscopy (REES) with time resolved laser spectroscopy allows obtaining new important information on microstructure of solutions as well as on characteristics of biological membranes. In particular such approach opens unique possibility to obtain the distribution of physical parameters (micropolarity and microviscosity) across bilayer of biological membrane with extremely high spatial resolution. Application of this approach to investigation of the human red blood cells and development on this basis of the new sensitive method of blood pathologies detection is demonstrated.

Anatoly N. Rubinov is a member of the National Academy of Sciences of Belarus, Merited Scientist of Belarus graduated from the Belarus State University in 1961. The PhD thesis (1965) was devoted to ruby laser and spectroscopy of excited ruby; a Doctor of Sciences degree (1972) was received for development and investigation of dye lasers. He is the winner of high scientific awards: the USSR State Prize (1972) and the State Prize of Belarus (1994), one of the pioneers of dye lasers. Published more than 350 scientific papers and four books in the field of laser physics and spectroscopy, has more than fifty patents. His main results are in the field of ruby and neodymium glass lasers (early 1960s); various types of dye lasers; new laser dyes and spectroscopy of organic molecules; intracavity laser spectroscopy; distributed-feedback (DFB) lasers including holographic DFB lasers; mode locked dye lasers and time resolved laser spectroscopy of organic molecules in liquids (excited states, inhomogeneous broadening due to the fluctuations of local microstructure, intermolecular hydrogen bonding, fluorescent probes in bio-membranes). Now he is a head of the laboratory on laser dyes in the Institute of Physics of the National Academy of Science of Belarus in Minsk. A.N. Rubinov has wide international scientific contacts, he worked in several laboratories abroad (Canada, Germany), participated in organizing committees of many international conferences, he is a member of the Editorial Board of the "Journal of Fluorescence" and of the "Quantum Electronics".

#204

Introduction to Photonic Crystals

Alexei M. Zheltikov, *M.V.Lomonosov Moscow State University, Moscow, Russia*

A brief introduction to the rapidly growing area of research related to photonic crystals will be given. The physics of the photonic band gap (PBG) and applications of PBG structures will be discussed. The abilities of such structures to guide and localize light, to phase-match and enhance nonlinear interactions, and to chirp, compress, and switch laser pulses will be examined. Different types of PBG structures allowing photonic band gaps to be produced in one, two, and three dimensions will be considered.

Aleksei M. Zheltikov graduated from the Physics Department of M.V.Lomonosov Moscow State University. Received his Diploma in Physics in 1987, Candidate of Science (PhD) degree in 1990, and Doctor of Science degree in 1999. Professor at the Physics Department, M.V. Lomonosov Moscow State University. Scientific interests: nonlinear optics and spectroscopy, photonic crystals. Received the 1996 Prize of the European Academy of Sciences for Young Scientists, the 1997 State Prize of Russian Federation for Young Scientists, and the 2000 I.I. Shuvalov Prize for Research from Moscow State University. The research of his group is now supported by the President of Russian Federation Grant. Member of the Advisory Board for the Journal of Raman Spectroscopy. Member of the Steering Committee of the International Conference on Raman Spectroscopy and Program Committees of the International Conferences on Coherent and Nonlinear Optics (ICONO), International Quantum Electronics Conference (IQEC'2002), International Laser Physics Workshops.

AGENDA OF SESSIONS

All sessions are in the Belarus Cultural Center
Minsk, Belarus

Tuesday, June 26, 2001

	Conference Hall
13:00–15:30	**Opening Remarks. Plenary Lectures I**
13:30–14:30	**TuA1 (Plenary Lecture)** • Nonlinear polarization dynamics in laser systems, A.P.Voitovich, *National Academy of Sciences of Belarus, Belarus*
14:30–15:30	**TuA2 (Plenary Lecture)** • Femtosecond coherent Raman spectroscopy, W. Kiefer, *Universität Würzburg, Germany*
15:30–16:00	**COFFEE BREAK**
16:00–18:00	**TuB • R. V. Khokhlov Memorial Session**
16:00–16:30	**TuB1 (invited)** • Control of nuclear processes in fs-laser plasma: Towards stimulated γ-emission, A.V.Andreev, V. M. Gordienko, A. B. Savel'ev-Trofimov, *Moscow State University*
16:30–17:00	**TuB2 (invited)** • Localized optical waves in quadratic media, A. P. Sukhorukov, *Moscow State University*
17:00–17:30	**TuB3 (invited)** • Rem Khokhlov—A man, scientist, and manager of science, V.G.Dmitriev, *R&D Inst. "Polyus"*
18:30–21:00	**WELCOME RECEPTION**

Wednesday, June 27, 2001

	Hall 1	Hall 2	Hall 3	Hall 4	Hall 5
8:30–10:30	WA Physics of Nanostructures I	WB High-Precision Measurements in Optics I	WC Symposium on Entangled States I	WD Lasers in Chemistry, Biophysics, and Biomedicine I	WE ISTC Workshop I
10:30–11:00	COFFEE BREAK				
11:00–12:30	WF Physics of Nanostructures II	WG High-Precision Measurements in Optics II	WH Symposium on Entangled States II	WI Lasers in Chemistry, Biophysics, and Biomedicine II	WJ ISTC Workshop II
12:30–14:00	LUNCH (on your own)				
14:00–16:00	WK Physics of Nanostructures III	WL High-Precision Measurements in Optics III	WM Symposium on Entangled States III	WN Lasers in Chemistry, Biophysics, and Biomedicine III	WO Fundamental Aspects of Laser–Matter Interaction I
16:00–16:30	COFFEE BREAK				
16:30–18:30	WP Physics of Nanostructures IV	WQ FREE	WR Symposium on Entangled States IV	WS Lasers in Chemistry, Biophysics, and Biomedicine IV	WT Fundamental Aspects of Laser–Matter Interaction II
18:30–20:00	WU Physics of Nanostructures (Posters)	WV High-Precision Measurements in Optics (Posters)		WX ISTC Workshop (Posters)	WY Fundamental Aspects of Laser–Matter Interaction (Posters)

Thursday, June 28, 2001

	Conference Hall
8:30–10:30	ThA • Plenary Lectures II
8:30–9:30	ThA1 (Plenary Lecture) • Optical frequency standards—the clocks of the future, L. Hollberg, *National Institute of Standards, USA*
9:30–10:30	ThA2 (Plenary Lecture) • Optical tomography of biotissues: old problems and new developments, A.Sergeev, *Institute of Applied Physics, RAS, Russia*
10:30–12:30	EXHIBIT ONLY TIME, COFFEE BREAK IS SERVED AT THE EXHIBIT
12:30–14:00	LUNCH (on your own)

	Hall 1	Hall 2	Hall 3	Hall 4	Hall 5
14:00–16:00	ThB Physics of Nanostructures V	ThC Nonlinear Optical Phenomena I	ThD Lasers in Chemistry, Biophysics, and Biomedicine V	ThE Quantum and Atomic Optics I	ThF Fundamental Aspects of Laser–Matter Interaction III
16:00–16:30	COFFEE BREAK				
16:30–18:30	ThG FREE	ThH Nonlinear Optical Phenomena II	ThI Lasers in Chemistry, Biophysics, and Biomedicine VI	ThJ Quantum and Atomic Optics II	ThK Fundamental Aspects of Laser–Matter Interaction IV
18:30–20:00		ThM Nonlinear Optical Phenomena (Posters)	ThN Lasers in Chemistry, Biophysics, and Biomedicine (Posters)	ThO Quantum and Atomic Optics (Posters)	ThP Optical Information Processing, Transmission, and Storage (Posters)

Friday, June 29, 2001

	Hall 1	Hall 2	Hall 3	Hall 4	Hall 5
8:30–10:30	FA Seminar on Nonlinear Materials I	FB Nonlinear Optical Phenomena III	FC Ultrafast Phenomena I	FD Quantum and Atomic Optics III	FE Nonlinear Dynamics of Optical Systems I
10:30–12:30	EXHIBIT ONLY TIME, COFFEE BREAK IS SERVED AT THE EXHIBIT				
12:30–14:00	LUNCH (on your own)				
14:00–16:00	FF Seminar on Nonlinear Materials II	FG Nonlinear Optical Phenomena IV	FH Ultrafast Phenomena II	FI Quantum and Atomic Optics IV	FJ Nonlinear Dynamics of Optical Systems II
16:00–16:30	COFFEE BREAK				
16:30–18:30	FK Seminar on Nonlinear Materials III	FL Nonlinear Optical Phenomena V	FM Ultrafast Phenomena III	FN Quantum and Atomic Optics V	FO Nonlinear Dynamics of Optical Systems III
18:30–20:00	FP Seminar on Nonlinear Materials (Posters)	FQ Strong Laser Fields and High Field Physics (Posters)	FR Ultrafast Phenomena (Posters)	FS Novel Trends in Nonlinear Laser Spectroscopy and Optical Diagnostics (Posters)	FT Nonlinear Dynamics of Optical Systems (Posters)

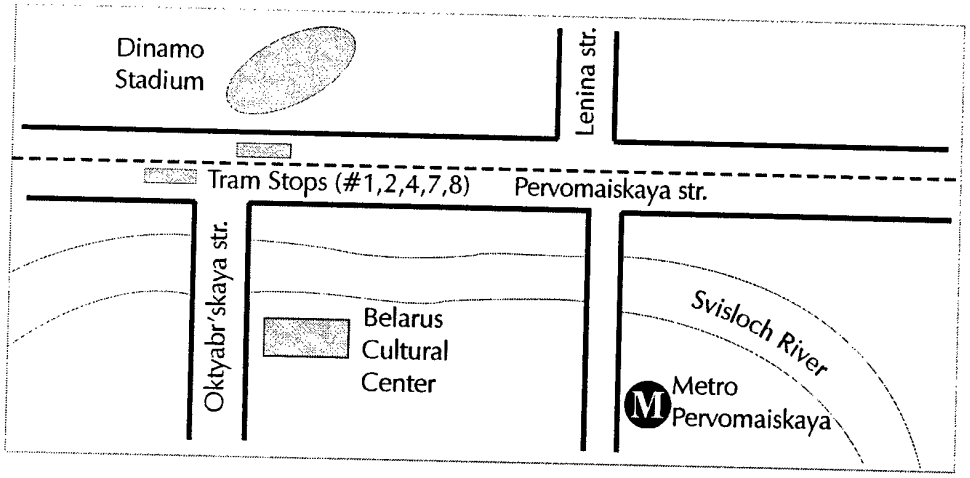
Saturday, June 30, 2001

	Hall 1	Hall 2	Hall 3	Hall 4	Hall 5
8:30–10:30	SA Novel Trends in Nonlinear Laser Spectroscopy and Optical Diagnostics I	SB Strong Laser Fields and High Field Physics I	SC Ultrafast Phenomena IV	SD Nonlinear Dynamics of Optical Systems V	SE Optical Information Processing, Transmission, and Storage I
10:30–11:00	COFFEE BREAK				
11:00–12:30	SF Novel Trends in Nonlinear Laser Spectroscopy and Optical Diagnostics II	SG Strong Laser Fields and High Field Physics II	SH Ultrafast Phenomena V	SI Nonlinear Dynamics of Optical Systems VI	SJ Optical Information Processing, Transmission, and Storage II
12:30–14:00	LUNCH (on your own)				
14:00–16:00	SK Novel Trends in Nonlinear Laser Spectroscopy and Optical Diagnostics III	SL Strong Laser Fields and High Field Physics III		SN Session PDL I	SO Optical Information Processing, Transmission, and Storage III
16:00–16:30	COFFEE BREAK				
16:30–18:30	SP Novel Trends in Nonlinear Laser Spectroscopy and Optical Diagnostics IV	SQ Strong Laser Fields and High Field Physics IV		SS Session PDL II	ST Optical Information Processing, Transmission, and Storage IV
19:00–22:0	CONFERENCE RECEPTION				

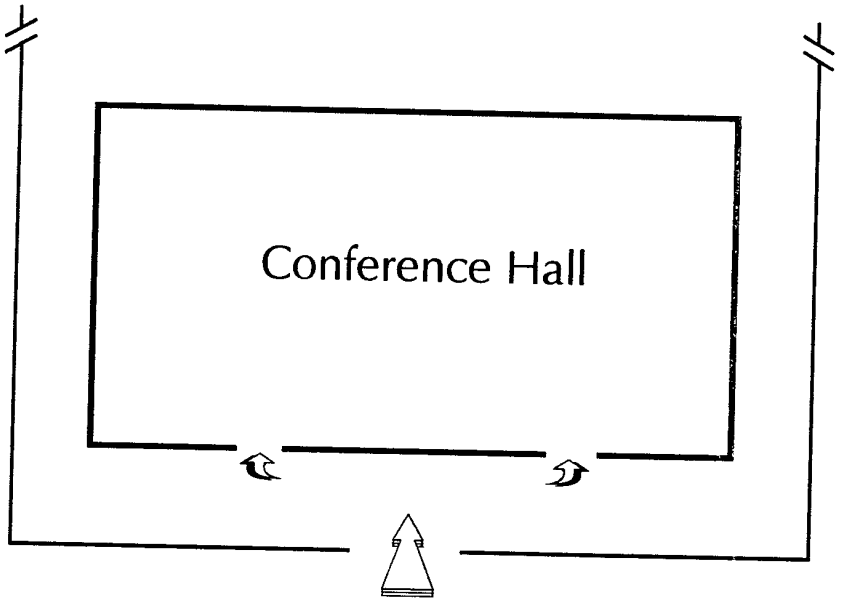
Sunday, July 1, 2001

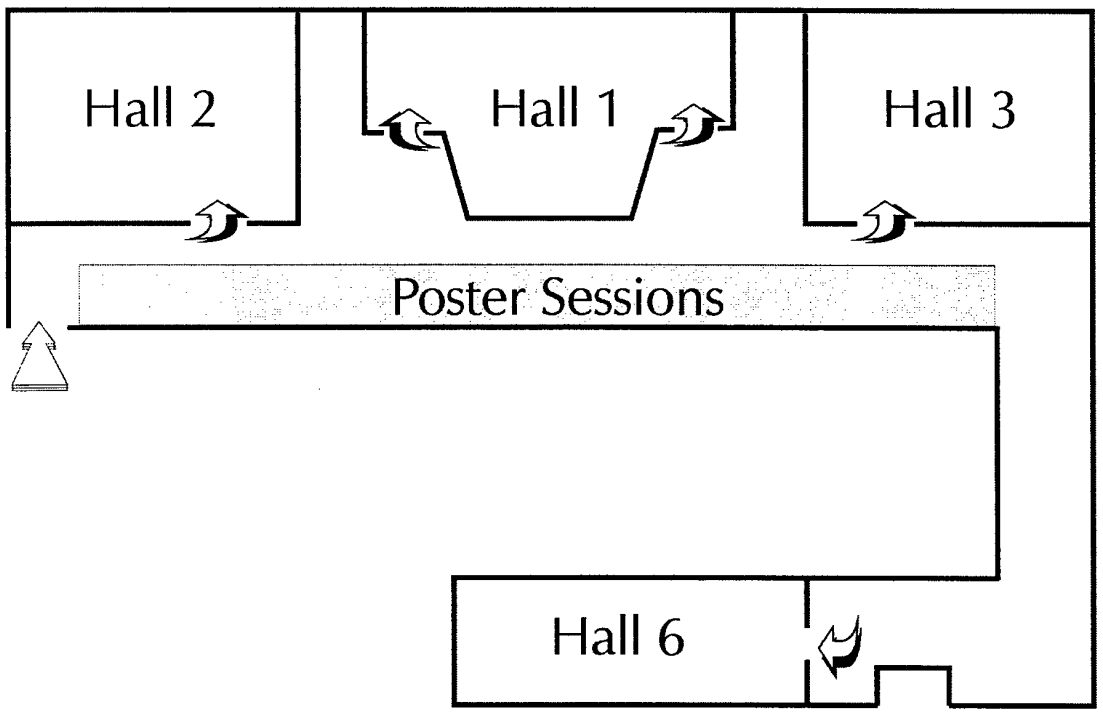
	Hall 1	Hall 2	Hall 3	Hall 4	Hall 5
8:30–11:15		SuB Strong Laser Fields and High Field Physics V			
11:30–12:00	CONFERENCE CLOSING				

Conference Venue Location

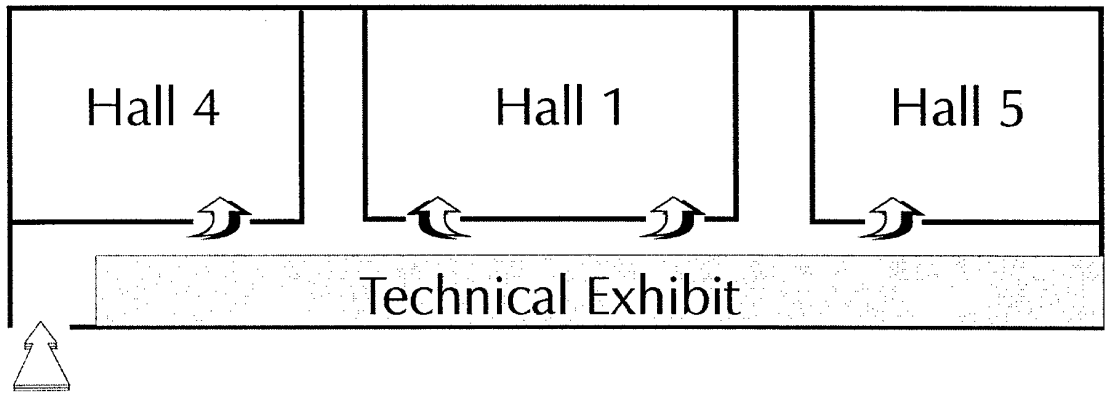


Floor 1





Floor 3



Floor 4

NOTES

TECHNICAL PROGRAM

All sessions are in the Belarus Cultural Center
Minsk, Belarus

Conference Hall

13:00–15:30
TuA • Opening. Plenary Lectures I
N.S.Kazak, *B.I.Stepanov Inst. of Physics, NASB, Belarus, Presider*

13:00–13:30
Welcome and Preliminary Remarks

13:30–14:30
TuA1 (Plenary Lecture) • Nonlinear polarization dynamics in laser systems, A.P.Voitovich, *National Academy of Sciences of Belarus, Belarus.*

14:30–15:30
TuA2 (Plenary Lecture) • Femtosecond coherent Raman spectroscopy, W.Kiefer, T.Chen, M.Heid, A.Materny, J.Popp, S.Schlücker, U.Schmitt, T.Siebert, A.Vierheilig, *Univ. Würzburg, Germany.* By means of femtosecond time-resolved coherent Raman spectroscopy we monitor the ultrafast vibrational dynamics in molecules and solids in the electronic ground state of the system. Various vibrational relaxation phenomena are studied.

15:30–16:00 COFFEE BREAK

Conference Hall

16:00–17:30
TuB • R. V. Khokhlov Memorial Session
P.A.Apanasevich, *B.I.Stepanov Inst. of Physics, NASB, Belarus, Presider*

16:00–16:30
TuB1 (Invited) • Control of nuclear processes in fs-laser plasma: Towards stimulated γ-emission, A.V.Andreev, V.M. Gordienko, A.B. Savel'ev, *Moscow State Univ., Russia.* Hot dense plasma created by fs laser pulse at a surface is a bright source of energetic electrons and photons with energy of a few keV at laser intensity 10^{16} W/cm^2 to a few MeV at 10^{19} W/cm^2. As a result, different nuclear processes can be initiated in plasma and surrounding area. The possibility of low energy nuclear level excitation and isotope separateion are discussed.

16:30–17:00
TuB2 (Invited) • Localized optical waves in quadratic media, A.P.Sukhorukov, *Moscow State Univ., Russia.* Parametric self-action, self-focusing, soliton trapping, vortex transformation, and other effects in quadratic media are discussed. Influence of phase mismatch and walk-off effect on such processes is analyzed. Features of parametric interactions in QPM and photonic crystals are considered.

17:00–17:30
TuB3 (Invited) • Rem Khokhlov—A man, scientist, and manager of science, V.G.Dmitriev, *R&D Inst. "Polyus", Russia.*

18:30–21:00 WELCOME RECEPTION

NOTES

Hall 1

8:30–10:30
WA • Physics of Nanostructures I
F.Träger, *Univ. of Kassel, Germany, Presider*

8:30
WA1 (Keynote) • Photonic crystal fibers and films, P.St.J.Russell, *Univ. of Bath, UK.* Microstructuring can radically enhance the optical properties of mundane materials, leading to higher performance devices and in some cases entirely new classes of behavior. The textbooks are currently being re-written.

Hall 2

8:30–10:30
WB • High-Precision Measurements in Optics I
L.Hollberg, *Nat. Inst. of Standards, USA, Presider*

8:30
WB1 (Keynote) • Optical Clocks: Today and tomorrow, S.N.Bagayev, *Inst. of Laser Phys., Russia.*

Hall 3

8:30–10:30
WC • Symposium on Entangled states I
V.N.Zadkov, *Moscow State Univ., Russia, Presider*

8:30
WC1 (Invited) • Hyperentanglement in parametric down-conversion, V.Sergienko, M.Atature, G.Di Giuseppe, M.D.Shaw, B.E.A.Saleh, M.C.Teich, *Boston Univ., USA.* A general theory of spontaneous parametric down-conversion, which gives rise to a quantum state that is hyperentangled in momentum, frequency, and polarization, allows us to understand the unusual characteristics of fourth-order quantum interference observed in ultrafast parametric down-conversion. The comprehensive approach provided here permits the engineering of quantum states suitable for quantum information schemes and new quantum technologies.

9:00
WC2 (Invited) • Quantum entanglement, teleportation and lithography, Y.Shih, *Univ. of Maryland, USA.* Quantum teleportation and quantum lithography experiments have been demonstrated recently at UMBC. The distinct feature of our teleportation experiment is that the complete set of Bell states can be distinguished in the Bell state measurement. By utilizing a two-photon entangled state we have also "beaten" the diffraction limit of classical lithography by a factor of two.

Hall 4

8:30–10:30
WD • Lasers in Chemistry, Biophysics, and Biomedicine I
J.Fujimoto, *M.I.T., USA, Presider*

8:30
WD1 (Keynote) • Single molecule detection in life science, T.Yanagida, *Osaka Univ. Graduate School of Medicine, Japan.* I will survey the applications of single molecule detection (SMD) techniques to several biological molecular machines and briefly discuss the unique mechanism of motion underlying molecular motors, the system on which SMD has been most successfully used.

Hall 5

8:30–10:30
WE • ISTC Workshop I
L.N.Orlov, *Stepanov Inst. of Physics, NASB, Belarus, Presider*

8:30
WE1 • ISTC Projects in the field of coherent and nonlinear optics, Yu.I.Malakhov, *ISTC, Russia.* The ISTC has received more than 200 laser-related proposals from Russian and non-Russian CIS institutions, including those involved in former Soviet weapons programs. These project proposals cover a large number of areas of science and applications. The results of some selected projects, concerned with laser science and applications, where spectacular advances have been achieved, are presented.

8:45
WE2 • The experience of ISTC activity in Belarus on Belarusian projects in field of lasers and optics, A.Klepatsky, *Int. Sci. and Technology Center, Belarus.* The ISTC programs and activity are presented and discussed. The ISTC projects in Belarus are described. The distribution by technology stages, by participating institutes, by duration and costs etc. are presented and analyzed. The main emphasis is made on projects in field of lasers and optics.

9:00
WE3 • Good reason for collaboration through the ISTC, K.-I. Ueda, *Univ. of Electrocommunications, Tokyo, Japan.*

Hall 1

WA • Physics of Nanostructures I (Continued)

9:15
WA2 (Invited) • Holey fibers with 0.4-32-μm-lattice-constant photonic band-gap cladding: fabrication, characterization, and applications, A.M.Zheltikov, A.B.Fedotov, M.V.Alfimov, A.A.Ivanov, S.N.Bagayev, V.S.Pivtsov, A.P.Tarasevitch, D.von der Linde, A.A.Podshivalov, L.A.Golovan, P.K.Kashkarov, V.I.Beloglazov, B.A.Kirillov, S.A.Magnitskii, A.V.Tarasishin, D.Chorvat, D.Chorvat (Jr.), A.N.Naumov, D.A.Sidorov-Biryukov, L.A.Mel'nikov, N.B.Skibina, *Moscow State Univ., Russia.* The structure and optical properties of holey fibers with the lattice constant of the photonic band-gap cladding ranging from 0.4 to 32 μm are investigated. Propagation of Ti:sapphire and Cr:forsterite laser pulses through such fibers is studied.

9:45
WA3 (Invited) • Resonant enhancement of optical nonlinearities in photonic band structures, J.W.Haus, *Univ. of Dayton, USA.* This talk discusses unusual dispersion and field resonance properties of periodic dielectric structures. Applications to harmonic or parametric generation are examined in detail.

Hall 2

WB • High-Precision Measurements in Optics I (Continued)

9:15
WB2 (Invited) • 400 Hz two-photon Ramsey fringes in the 30 THz spectral range, A.Shelkovnikov, Ch.Grain, C.T. Nguyen, R.J.Butcher, A.Amy-Klein, Ch. Chardonnet, *Univ. Paris 13, France.* A two-photon Ramsey fringe experiment was performed with a supersonic beam of SF_6. With 50 cm between zones, the periodicity is 400 Hz. This is very promising for a new frequency standard at 10 μm.

9:45
WB3 (Invited) • Frequency stabilization of He-Ne laser over 100 Hz methane resonances, S.N.Bagayev, A.K.Dmitriyev, A.A.Lugovoy, V.M.Semibalamut, *Inst. of Laser Phys., Russia.* Frequency stabilization of He-Ne laser over 100 Hz methane resonances was realized. The frequency shifts of recoil doublet components for different parameters were measured. The estimated reproducibility of the methane standard is about of 10^{-14}.

Hall 3

WC • Symposium on Entangled states I (Continued)

9:30
WC3 (Invited) • Basic polarization states of biphotons: preparation and measurement, A.V.Burlakov, M.V.Chekhova, O.A.Karabutova, S.P.Kulik, *Moscow State Univ., Russia.* Possibilities to prepare and measure different polarization states of biphoton field are discussed. Starting from superposition of two type-I collinear degenerate biphoton states, we experimentally synthesized and measured a continuous set of states consisting of correlated photons with orthogonal polarizations.

Hall 4

WD • Lasers in Chemistry, Biophysics, and Biomedicine I (Continued)

9:15
WD2 (Invited) • Infrared fiber lasers and tissue interactions, T.A King, *Univ. of Manchester, UK.* The interaction characteristics are described of high power continuous wave and pulsed near infrared fiber lasers developed for medical applications. Tissue absorption and interaction are related to laser radiation properties.

9:45
WD3 • Thermo-optical nonlinear effects induced by radiation of IR-lasers in biological tissues, A.I.Omel'chenko, V.N. Bagratashvili, E.N.Sobol, A.P.Sviridov, S.I.Tzipina, *Inst. of Laser and Inform. Technology, Russia,* V.P.Gapontsev, V.P.Minaev, I.E.Samartzev, *IRE-POLUS Group, Russia,* G.Sh.Makhmutova, *Medical Ctr. of Dept. of President of Russian Federation.*

Hall 5

WE • ISTC Workshop I (Continued)

9:15
WE4 • SBS phase conjugation of super-high quality for a commercial ns-pulsed laser, F.A.Starikov, *Russia.*

9:30
WE5 • Nonlinear optical conversion of radiation from Ti:Sapphire lasers: new availabilities for creation of all-solid-state high-energy laser systems continuously tunable from 188.5 to 1400 nm, V.A.Orlovich, P.A.Apanasevich, A.S. Grabtchikov, *Stepanov Inst. of Phys., Belarus,* A.V.Kachinski, V.D.Kopachevski, A.A.Bui, *JV Solar TII Ltd, Belarus,* H.J.Eichler, *Tech. Univ. Berlin, Germany,* W.Kiefer, *Univ. Wuerzburg, Germany,* P.Turpin, *Univ. P.et M.Curie, France.*

9:45
WE6 • Problems of PC correction in laser power transmission to space, Romanov N.A., N.A.Kalitievskii, A.F.Kornev, V.I.Kuprenyuk, A.A.Leshchev, V.P. Pokrovskii, A.Yu.Rodionov, V.E.Semenov, V.E.Sherstobitov, M.F.Vasil'ev, N.V Vysotina, Res. Inst. for Laser Phys., Russia.

Hall 1

WA • Physics of Nanostructures I (Continued)

10:15
WA4 • Photonic crystal fibers with elliptical pores, D.Mogilevtsev, *Stepanov Inst. of Phys., Belarus,* J.Broeng, S.E.Barkou, *Tech. Univ. of Denmark, Denmark.* In this work we suggest a microstructure of air capillaries with elliptical cross-section in a tread of glass, which gives an opportunity for creation of a polarization-preserving fiber with very small beat length between the fundamental modes of different polarization. Optimal design of such fibers is also discussed.

Hall 2

WB • High-Precision Measurements in Optics I (Continued)

10:15
WB4 • Femtosecond optical clock, S.N.Bagayev, A.K.Dmitriyev, A.S.Dychkov, V.F.Zakharyash, V.M.Klementyev, D.B. Kolker, S.A.Kuznetsov, Yu.A.Matyugin, M.V.Okhapkin, V.S.Pivtsov, M.N. Skvortsov, S.V. Chepurov, *Inst of Laser Phys., Russia,* A.M.Zheltikov, *Moscow State Univ., Russia,* V.I. Beloglazov, *Inst. of Technology and Processing of Glass Structures, Russia.*

Hall 3

WC • Symposium on Entangled states I (Continued)

10:00
WC4 (Invited) • Quantum holographic teleportation: physical limits and fidelity, A.Gatti, L.A.Lugiato, Universitá dell'Insubria, Italy, I.V.Sokolov, *St.-Petersburg Univ., Russia,* M.I.Kolobov, *Univ. de Lille, France.* We consider the characteristic space-time scales of holographic teleportation and the optimization of these scales. The fidelity of teleportation of essentially multimode light field is found. The role of the space-time scales and of the number of the teleported field degrees of freedom is examined.

Hall 4

WD • Lasers in Chemistry, Biophysics, and Biomedicine I (Continued)

10:00
WD4 • Photodynamic laser therapy in the transparency region of biotissues using tricarbocyanine dyes as photosensitizers, E.S.Voropay, *Belarusian State Univ., Belarus,* M.P.Samtsov, A.P.Lugovsky, *Res. Inst. for Appl. Phys. Problems, Belarus,* E.A.Zhavrid, Yu.P.Istomin, E.N. Alexandrova, V.N.Chalov, *Res. Inst. of Oncology and Med. Radiology, Belarus.* Phototoxicity of certain tricarbocyanine dyes was studied *in vitro* and *in vivo* using the semiconductor laser radiation (λ=740 nm); photophysical properties of the dyes in such systems were investigated.

10:15
WD5 • Processing of bone and cartilage tissue with pulsed CO_2 lasers: an in vitro investigation, M.M.Ivanenko, S.Afilal, T.Mitra, *CAESAR, Germany,* P.Hering, *Duesseldorf Univ., Germany.* Study with three types of CO_2 laser ($\tau_{1/2}$=45ns – 100 μs) has purpose to clear some aspects of hard tissue ablation and to find an optimal irradiation parameters for practical medical application.

Hall 5

WE • ISTC Workshop I (Continued)

10:00
WE7 • Ground and excited state dipole moments of new flavonols to probe the effect of gradient laser fields in biomembranes, W.Baumann, *Univ. of Mainz, Germany,* N.A.Nemkovich, *Stepanov Inst. of Phys., Belarus.* The ISTC project #B-479, designed by Prof. A.N.Rubinov on the biophysical application of gradient laser fields, uses new flavonol fluorescent probes to study the influence on biological objects. Results of electrooptical measurements of the electrical dipole moments of new flavonols are presented.

10:15
WE8 • Spatial-temporal dynamics of the concentrational response of polarizing particles exposed to the action of a gradient force in a high-power laser radiation field, A.N.Rubinov, A.A.Afanas'ev, S.I.Voitovich, Yu.A.Kurochkin, S.Yu.Mikhnevich, I.Ye.Yermalayev, *Stepanov Inst. of Phys., Belarus.* In the work, the results of theoretical investigation of spatial-temporal dynamics of the concentrational response of polarizing particles found in a solvent under the action of gradient force arising in the field of a nonresonance spatially modulated laser radiation are presented.

10:30–11:00 COFFEE BREAK

Hall 1

11:00–12:30
WF • Physics of Nanostructures II
A.M.Zheltikov, *Moscow State Univ., Presider*

11:00
WF1 • Four-wave mixing in one-dimensional photonic crystals: inhomogeneous wave excitation, A.V.Andreev, A.V.Balakin, A.B.Kozlov, I.A.Ozheredov, I.R.Prudnikov, A.P.Shkurinov, *Moscow State Univ., Russia,* P.Masselin, G.Mouret, *Univ. du Littoral, France.* We demonstrate both numerically and experimentally that in one-dimensional photonic crystal the inhomogeneous waves may be excited with the degenerate four-wave mixing. The conversion efficiency in $\omega_3=2\omega_1+\omega_2$ process of the order of 10^{-5} was measured.

11:15
WF2 • Giant microcavity enhancement of quadratic nonlinear response of porous silicon photonic crystals, A.A.Fedyanin, T.V.Dolgova, M.G.Martemyanov, O.A.Aktsipetrov, *Moscow State Univ., Russia,* D.Schuhmacher, G.Marowsky, *Laser Lab. Goettingen, Germany,* V.A.Yakovlev, *Inst. of Spectroscopy, Russia,* G.Mattei, *CNR, Area della Ricerca di Roma, Italy.*

11:30
WF3 (Invited) • Photons and electrons in mesoscopic structures, S.V.Gaponenko, *Inst. of Mol. and Atomic Phys., Belarus.* Electrons and photons mesoscopic structures behave similar if potential relief with respect to electrons is considered by analogy with local dielectric function with respect to electromagnetic waves. An overview of properties and processes is presented of electronic and photonic mesostuctures and a transfer of concepts from optics to solid-state physics and back is discussed.

Hall 2

11:00–12:30
WG • High-Precision Measurements in Optics II
A.Weis, *Univ. de Fribourg, Switzerlands, Presider*

11:00
WG1 (Invited) • The design of a compact optical frequency synthesizer, Th.Udem, R.Holzwarth, M.Zimmermann, T.W. Hänsch, *Max-Planck-Inst. für Quantenoptik, Germany,* J.C.Knight, W.J.Wadsworth, P.St.J.Russell, *Univ. of Bath, UK.* We describe an optical synthesizer based on an octave spanning frequency comb. The device stabilizes the frequency of one mode with respect to its own harmonic. It is capable of measuring almost any optical frequency without modification.

11:30
WG2 (Invited) • Frequency standard based on Nd:YAG/I_2 laser system, A.Yu.Nevsky, P.V.Pokasov, M.N.Skvortsov, S.N.Bagayev, *Inst of Laser Phys., Russia,* H.Schnatz, F.Riehl, *Phys.-Tech. Bundesanstalt, Germany,* J.von Zanthier, E.Peik, H.Walther, R.Holzwarth, J.Reichert, Th.Udem, T.W.Hansch, *Max-Planck-Inst. für Quantenoptik, Germany.* Two-wavelength optical frequency standard based on Nd:YAG/I_2 laser system was developed. Influence of physical factors at frequency stability and reproducibility was investigated. A frequency

Hall 3

11:00–12:30
WH • Symposium on Entangled states II
A.Sergienko, *Boston Univ., USA, Presider*

11:00
WH1 (Invited) • Entanglement of macroscopic atomic samples, towards teleportation of atoms, B.Julsgaard, E.S.Polzik, *Univ. of Aarhus, Denmark.* We report on the experiment in which collective spins of two macroscopic atomic samples are entangled by a measurement. Applications to atomic teleportation and other quantum information protocols will also be discussed.

11:30
WH2 (Invited) • Entangling macroscopic oscillators, V.Giovannetti, S.Mancini, P.Tombesi, *Università di Camerino, Italy.* It will be shown how to entangle macroscopic massive oscillators by exploiting the radiation pressure force acting on two oscillating mirrors of a circular cavity.

Hall 4

11:00–12:30
WI • Lasers in Chemistry, Biophysics, and Biomedicine II
B.M.Dzhagarov, *Inst. of Molecular and Atomic Physics, NASB, Belarus, Presider*

11:00
WI1 (Invited) • Laser spectroscopy applied to environmental and medical research, S.Svanberg, *Lund Inst. of Technology, Sweden.* Laser spectroscopy, provides many possibilities for real-world applications. Powerful techniques have been developed for chemical analysis, combustion diagnostics, environmental monitoring and biomedical diagnostics. The present paper focuses on the two latter aspects.

11:30
WI2 (Invited) • Fast relaxation processes in immunoactive heterosteroid molecules, A.A.Akhrem, A.L.Mikhalchuk, *Inst. of Bioorganic Chem., Belarus,* N.A.Borisevich, G.B.Tolstorozhev, *Inst. of Mol. and Atomic Phys., Belarus.* The most motivation and "top task" of researches are to combine spectroscopic and laser-physical studies of heterosteroids, theoretical and quantum chemistry results as well as photobiological experiments on natural objects (protein *in situ*) with the intent to analyze the electronic structure of biomolecules, the latter being bound

Hall 5

11:00–12:15
WJ • ISTC Workshop II
Yu.I.Malakhov, *ISTC, Russia, Presider*

11:00
WJ1 • Yb:KYW microchip laser, A.N.Kuzmin, V.A.Orlovich, *Stepanov Inst. of Phys., Belarus,* A.A.Demidovich, *Inst. of Mol. and Atomic Phys., Belarus,* M.B.Danailov, *Lab. for Lasers and Optical Fibers, Italy,* A.Bednarkevich, W.Strek, *Inst. for Low Temp. and Struct, Res., Poland,* H.J.Eichler, *Technische Univ. Berlin, Germany,* A.N.Titov, *Vavilov State Optical Inst., Pussia.*

11:15
WJ2 • Optically pumped transverse lasers based on ZnMgSSe/ZnSe and InGaN/GaN heterostructures, E.V.Lutsenko, V.Z.Zubialevich, V.N.Pavlovskii, I.P. Marko, A.L.Gurskii, G.P.Yablonskii, *Stepanov Inst. of Phys., Belarus,* H. Kalisch, *Inst. für Theor. Elektrotechnik, RWTH Aachen, Germany,* O.Schon, H.Protzmann, M.Luenenbuerger, B.Schineller, M.Heuken, *AIXTRON AG, Germany.*

11:30
WJ3 • Methods and devices for optical digital processing, transfer and switching of light signals on the basis of optical bistability and anisotropy in crystals and A2B6, A3B5 semiconductor compounds, A.M.Goncharenko, G.V.Sinitsyn, S.P.Apanasevich, N.A.Khilo, V.L. Malevich, A.S.Yasukevich, M.A.Khodasevich, A.V.Lyakhnovich, I.A.Utkin, A.V. Kazberuk, N.A.Saskevich, N.V.Strizhenok, M.V.Rogovaya, *Div. for Optical Problems in Inform. Technologies, Belarus.*

Hall 1

WF • Physics of Nanostructures II (Continued)

12:00
WF4 (Invited) • Coherent long-lived electron-nuclear vibrations in ordered polyacetylene nanoparticles, D.Yu.Paraschuk, *Moscow State Univ., Russia,* V.M.Kobryanskii, *Inst. of Chem. Phys., Russia.* We found a "resonant" behavior of Raman response of trans-nanopolyacetylene in its transparency range. We present a model of coherent weakly damped electron-nuclear vibrations in a π-conjugated chain because of strong nonlinear electron-lattice coupling.

Hall 2

WG • High-Precision Measurements in Optics II (Continued)

comparison and an absolute frequency measurement of two independent laser systems were realized.

12:00
WG3 (Invited) • Present status of high performance methane based transportable optical frequency standards, M.Gubin, A.Shelkovnikov, A.Kireev, E.Kovalchuk, D.Krylova, E.Petrukhin, V.Poloubojarov, M.Petrovskiy, D.Tyurikov, *Lebedev Phys. Inst., Russia.* Investigations of frequency stability, repeatability/reproducibility with a set of transportable He-Ne/CH_4 OFS carried out by direct comparison with H-maser and primary Cs frequency standard are presented. The physical and technological ways for radical improvement of the methane based gas and solid state OFS (λ=3.2–3.4 μm), including narrowing the reference linewidth down to 1 kHz (up to recoil doublet resolution) will be discussed as well as the new applications of these systems in combination with a novel "fs-comb optical/microwave bridge".

Hall 3

WH • Symposium on Entangled states II (Continued)

12:00
WH3 (Invited) • Quiet atoms, K.Mölmer, *Univ. of Aarhus, Denmark.* In this talk we review the definition and expected practical use of squeezed atomic states. We then address a series of very recent proposals for practical atomic squeezing. The connection between atomic squeezing and entanglement will be discussed.

Hall 4

WI • Lasers in Chemistry, Biophysics, and Biomedicine II (Continued)

with their immune action in living organisms.

12:00
WI3 • Subpicosecond photophysics of Cu(II) porphyrins: excited state quenching by an axial ligand association, V.S.Chirvony, *Inst. of Mol. and Atomic Phys., Belarus,* M.Negrerie, *ENSTA Centre de l'Ivette, France,* P.-Y.Turpin, *Univ. Pierre et Marie Curie, France.* Subpicosecond dynamics and mechanisms of quenching of the excited triplet state of cationic porphyrin Cu(II)TMPyP4 by water is studied. A participation of hot vibronic states is suggested to be a crucial factor in quenching through an axial ligand (water molecule) association.

12:15
WI4 • Pathways and mechanisms of relaxation processes in self-assembled porphyrin triads in solutions and films, E.I.Zenkevich, A.M.Shulga, *Inst. of Mol. and Atomic Phys., Belarus,* D.S.Kilin, C.von Borczyskowski, *Univ. of Technology Chemnitz, Germany.* Ps-fs time-resolved experimental data and theoretical calculations show that in porphyrin self-assembled triads the competition of charge and energy transfer between interacting subunits cause the complex relaxation dynamics depending on the solvent temperature and polarity.

Hall 5

WJ • ISTC Workshop II (Continued)

11:45
WJ4 • Laser hydroacoustic probe of wide medical application, G.I.Zheltov, N.I.Pozniak, A.S.Rubanov, *Stepanov Inst. of Phys., Belarus,* V.N.Rozhdestvin, I.N. Spiridonov, *Bauman Moscow State Techn. Univ., Russia.*

12:00
WJ5 • Theoretical and experimental results of investigation on atomic and nuclear processes in laser produced plasmas, V.S.Belyaev, A.P.Matafonov, *Central Res. Inst. of Machine Building of Russian Aviation Space Agency, Russia.* Results of investigations of atomic and nuclear processes in laser superdense plasma based on developed principally new conceptions, methods and means, and using of modified existing theoretical and experimental atomic and nuclear physics methods are presented.

12:30–14:00 LUNCH (on your own)

Hall 1

14:00–16:00
WK • Physics of Nanostructures III
TBA, *Presider*

14:00
WK1 (Invited) • Ultrafast electron dynamics in metal nanoparticles, F.Träger, *Univ. Kassel, Germany.* A novel technique has been developed for precise measurements of surface plasmon decay times in nanoparticles. Size and shape dependent dephasing times ranging from 2.5 to 10 fs have been obtained. They reflect the reduced dimensions of the nanoparticles.

14:30
WK2 (Invited) • Light-induced structural transformations and optical nonlinearity in gallium nano-films and self-assembled nanoparticles, K.MacDonald, V.Fedotov, G.Stevens, S.Pochon, W.Brocklesby, N.I.Zheludev, *Univ. of Southampton, UK,* V.I.Emel'yanov, *Moscow State Univ., Russia.* Only a few picograms of gallium, self-assembled into nanoparticles on the tip of an optical fiber, are sufficient to form a nonlinear mirror with intensity-dependent reflectivity associated with a light-induced structural change in the nanoparticles.

Hall 2

14:00–16:15
WL • High-Precision Measurements in Optics III
A.N.Goncharov, *Inst. of Laser Physics, RAS, Russia, Presider*

14:00
WL1 (Keynote) • Miniaturized laser magnetometers and atomic clocks, R.Wynands, C.Affolderbach, S.Knappe, M.Stähler, *Bonn Univ., Germany,* L.Hollberg, J.Kitching, *NIST, USA.* We present experimental investigations concerning the application of Zeeman-split coherent population trapping (CPT) resonances in thermal alkali-metal vapors to precision magnetometry with picotesla sensitivity and to the construction of a miniaturized atomic frequency reference.

Hall 3

14:00–16:00
WM • Symposium on Entangled states III
P.Tombesi, *Univ. di Camerino, Italy, Presider*

14:00
WM1 (Invited) • Quantum solitons—correlations and entanglement, G.Leuchs, *Univ. of Erlangen-Nuernberg, Germany.* Nonlinear Kerr-interaction of optical pulses in a fiber leads to amplitude squeezing and, via the interference of two such light fields, to entanglement. The quantification of the entanglement and the relevance for potential applications in quantum communications will be discussed.

14:30
WM2 • Two-photon coherent control of atomic collisions with non-classical light, M.D.Havey, *Old Dominion Univ., USA,* D.V.Kupriyanov, A.V.Slavgorodskii, I.M.Sokolov, *State Tech. Univ., Russia.* We describe a new method of coherent optical control of internal dynamics of atomic collisions by means of two correlated light beams having non-classical entangled polarizations.

Hall 4

14:00–16:00
WN • Lasers in Chemistry, Biophysics, and Biomedicine III
S.Svanberg, *Lund Univ., Sweden, Presider*

14:00
WN1 (Invited) • Biomedical imaging using ultrahigh resolution optical coherence tomography, J.G.Fujimoto, I.Hartl, W.Drexler, C.Chudoba, T.Ko, X.D.Li, P.Hsiung, U.Morgner, F.Kaertner, *Massachusetts Inst. of Technology, USA.* Optical coherence tomography performs noninvasive cross sectional imaging of internal microstructure in biological systems. Femtosecond laser sources can enable resolutions of 1 μm as well as spectroscopic imaging. Advances in technology and applications are discussed.

14:30
WN2 (Invited) • Fast visualization of internal structure of multiple-scattering objects by diffusion optical tomography, V.V.Shuvalov, I.V.Shutov, E.V.Tret'akov, *Moscow State Univ., Russia.* Algorithm of real-time visualization of large multiple-scattering objects' internal structure by diffusion optical tomography will be discussed. Experimental and computer-simulation (3D Monte-Carlo technique) data, obtained in such objects with some strongly-scattering inclusions, will be reported.

Hall 5

14:00–16:00
WO • Fundamental Aspects of Laser–Matter Interaction I
V.P.Silin, *Lebedev Phys. Inst., Russia, Presider*

14:00
WO1 (Keynote) • Nonlinear probing of acoustic, thermal and convective molecular motion, R.B.Miles, *Princeton Univ., USA.* Coherent Rayleigh scattering, laser-induced thermal anemometry, and RELIEF are three methods, which are currently providing quantitative measures of thermal motion, acoustic modes, and convection for localized measurements of parameters in gas phase flows.

Hall 1

WK • Physics of Nanostructures III (Continued)

15:00
WK3 (Invited) • Plasmonic meso- and nano-structures: New avenues for photonics, laser physics and spectroscopy, V.M.Shalaev, *New Mexico State Univ., USA.* Optical properties of metal meso- and nano-structures are reviewed. New phenomena, such as low-frequency plasmons, negative refractive index, and disorder-induced localization of plasmons, resulting in dramatic enhancement of optical nonlinearities, are discussed.

Hall 2

WL • High-Precision Measurements in Optics III (Continued)

14:45
WL2 (Invited) • Nonlinear Hartman Sensor, K.Poteomkin, N.F.Andreev, A.N. Mal'shakov, *Inst. of Appl. Phys., Russia.* Results of using the self-focusing effect in Kerr liquids for measurements of small wavefront distortions of laser radiation transmitted through a transparent optical sample are presented. An experimental prototype of a new device, a Scanning Nonlinear Hartmann Sensor, is described.

15:15
WL3 (Invited) • New optical correlation techniques for rough surfaces characterizing, O.V.Angelsky, P.P.Maksimyak, *Chernivtsi Natl Univ., Ukraine.* The possibilities for optical diagnostics of fractal surfaces are shown and the set of statistical and dimensional parameters of the scattered fields for surface roughness diagnostics is determined. A multifractal measuring device for estimation of these parameters is proposed.

Hall 3

WM • Symposium on Entangled states III (Continued)

14:45
WM3 • Anticorrelation effect in femtosecond-pulse pumped type-II SPDC, M.V.Chekhova, *Moscow State Univ., Russia.* V.Berardi, Y.H.Kim, Y.H.Shih, Univ. of Maryland, USA. Anticorrelation effect is observed for type-II spontaneous parametric down-conversion generated from femtosecond-pulse pump in a relatively thick BBO crystal. In agreement with the theory, shallow flat symmetric anticorrelation "dip" is observed.

15:00
WM4 (Invited) • Quantum information processing with trapped ions, F.Schmidt-Kaler, H.Rohde, S.Gulde, A.Mundt, P.Barton, D.Leibfried, J.Eschner, R.Blatt, *Univ. Innsbruck, Austria.* Single Calcium ions and linear ion strings are confined and observed in Paul traps. Ions are cooled to the ground state of their quantum motion and the internal (electronic) and vibrational quantum state is manipulated.

Hall 4

WN • Lasers in Chemistry, Biophysics, and Biomedicine III (Continued)

15:00
WN3 • Laser optoacoustic imaging of breast cancer *in vivo,* A.A.Karabutov, S.V.Solomatin, E.V.Savateeva, V.G.Andreev, Z.Gatalica, H.Singh, R.D.Fleming, A.A.Oraevsky, *BMEC, UTMB, USA.* The principles of new type of biomedical imaging are discussed. The first laser optoacoustic imaging system is described. The results of in-vivo study of breasy cancer are presented.

15:15
WN4 • Optoacoustic measurement of optical properties of turbid media, A.A.Karabutov, A.A.Oraevsky, *BMEC, UTMB,* N.B.Podymova, I.M.Pelivanov, P.S.Grashin, *Moscow State Univ., Russia.* Time-resolved laser optoacoustic method was developed for noninvasive measurement of the spatial distribution of light intensity in uniformly absorbing and scattering turbid media and to determine the optical properties of such media—light absorption and reduced scattering coefficients.

Hall 5

WO • Fundamental Aspects of Laser–Matter Interaction I (Continued)

14:45
WO2 (Invited) • Self-consistent equations for an atom interaction with electromagnetic field, A.V.Andreev, *Moscow State Univ., Russia.* We compare the atomic response calculated on the basis of solution of Maxwell equations for field and two different quantum equations for atom: traditional Schrödinger equation and Schrödinger equation with the self-consistent field.

15:15
WO3 (Invited) • Nonlinear optical processes in Rydberg atoms systems, E.A.Manykin, *RRC "Kurchatov Institute", Russia.* The interaction between Rydberg systems (Rydberg atoms (RA) gas or Rydberg matter (RM)) and coherent light in various frequency bands is considered. The experimental data and theoretical description of stimulated electronic laser Raman processes, wave mixing effects in gas of RA and their clusters of RM with quantum interference are analyzed.

Hall 1

WK • Physics of Nanostructures III (Continued)

15:30
WK4 • New method to study structural parameters of mesoscopic systems: optical fluctuation microscopy, A.M. Bonch-Bruevich, V.V.Khromov, N.B.Leonov, S.G.Przhibel'skii, T.A.Vartanyan, *Vavilov State Optical Inst., Russia.* A new optical technique for characterization of mesoscopic systems is proposed and tested experimentally. It is based on the registration of fluctuations of the scattered light intensity when the sharply focused laser beam is scanned throughout the system.

15:45
WK5 • Discrete spectrum of anti-Stokes emission from metal particle-adsorbate complexes in microcavity, V.P.Drachev, *Inst. of Semicond. Phys., Russia,* W.Kim, V.A.Podolskiy, V.M.Shalaev, R.L.Armstrong, *New Mexico State Univ., USA,* V.P.Safonov, *Inst. of Automation and Electrometry, Russia.* The discovery of broad-range, multiphoton excited emission from Ag aggregate-adsorbate complexes seeded into a cylindrical microcavity is presented. The discrete spectrum spans the range from the 632 nm HeNe laser exciting wavelength down to 200 nm.

Hall 2

WL • High-Precision Measurements in Optics III (Continued)

15:45
WL4 • Resonant surface polaritons of the cylindrical near-field tip, S.A.Alexeev, M.N.Libenson, D.S.Smirnov, *St-Petersburg State Inst. of Fine Mech. and Optics, Russia.* The propagation parameters and their relation with the medium properties were investigated for surface polaritons excited in coated cylindrical waveguide. It has been shown that the near field of cylindrical surface polariton (CSP) can be theoretically localized to arbitrarily small space.

16:00
WL5 • Superresolving processing of the complex response of differential interferometer with sampling expansions, D.V.Baranov, E.M.Zolotov, A.A.Yegorov, *General Phys. Inst., RAS, Russia.* The algorithm of resolution enhancement has been demonstrated in computer modelling for the inverse problem of differential heterodyne interferometer. The possibility of tenfold exceeding of the diffraction limit based on spectrum extrapolation with sampling expansion has been shown.

Hall 3

WM • Symposium on Entangled states III (Continued)

15:30
WM5 (Invited)• Applications of entangled state interference, G.Bjork, J.Soderholm, A.Trifonov, *Royal Inst. of Technology (KTH), Sweden.* P.Usachev, *Ioffe Phys. Tech. Inst., Russia,* L.L.Sanchez Soto, *Univ. Complutense, Spain.* In many areas of physics interference phenomena are lead to a wealth of applications. Entangled quantum states allow us to surpass the classical measurement sensitivity or resolution in interferometry, polarimetry, and imaging.

Hall 4

WN • Lasers in Chemistry, Biophysics, and Biomedicine III (Continued)

15:30
WN5 • Polarization visualizing and biofractals correlometry, O.V.Angelsky, A.G.Ushenko, D.N.Burkovets, Y.A.Ushenko, *Chernivtsi Natl Univ., Ukraine,* V.D.Pishak, O.V.Pishak, *Bukovinian State Medical Academy, Ukraine.* The present paper deals with the research of laser radiation polarized structure, transformed by biotissue crystalline phase. It is urgent in creating optical methods of diagnostics of biotissue orientation and mineralized structure, and in modeling biocomposit materials as well.

15:45
WN6 • Some ways to optimize optical imaging of tumor-like inclusions in biological tissues, V.V.Barun, A.Ya.Khairullina, *Stepanov Inst. of Phys., Belarus.* Image contrast of tumor-like inclusion in biological tissues is theoretically considered here for different observation schemes including illumination and viewing conditions and working spectral ranges. The investigations are directed towards the selection of an optimal experimental scheme and spectral range providing the maximum contrast.

Hall 5

WO • Fundamental Aspects of Laser–Matter Interaction I (Continued)

15:45
WO4 • Hanle effect in Rydberg atoms of sodium, I.Ryabtsev, D.Tretyakov, *Inst. of Semicond. Phys., Russia.* The Hanle effect in Rydberg atoms of sodium has been studied experimentally for the first time. An interference signal of the $37P_{3/2}$–$37S_{1/2}$ microwave transition at 70.166 GHz was recorded in the variable magnetic field. The signal was investigated for different polarizations of the laser emission exciting the $37P_{3/2}$ Rydberg state.

16:00–16:30 COFFEE BREAK

Hall 1

16:30–18:30
WP • Physics of Nanostructures IV
N.I.Zheludev, *Univ. of Southampton, UK, Presider*

16:30
WP1 (Invited) • Photorefractivity in novel nanostructured inorganic: organic hybrid media, P.N.Prasad, *Inst. for Lasers, Photonics and Biophotonics, USA.* This talk will present study of nanoscale processes associated with photorefractivity in novel inorganic: organic nanocomposites and will report observation of photorefractivity, for the first time, at the communication wavelength of 1.30 microns.

17:00
WP2 (Invited) • Novel approaches to measure the surface plasmon dephasing time: theoretical foundations and recent experimental results, T.A.Vartanyan, *Vavilov State Optical Inst., Russia.* We review the results of three recent successful attempts to overcome the problem of inhomogeneous broadening in nanostructured metal island films and to get unambiguous results for the surface plasmon dephasing times.

Hall 2

Hall 3

16:30–18:30
WR • Symposium on Entangled states IV
K.Mölmer, *Univ. of Aarhus, Denmark, Presider*

16:30
WR1 (Invited) • Nonlinear optics at the single-photon level, A.M.Steinberg, K.J.Resch, J.S.Lundeen, *Univ. of Toronto, Canada.* We observe enhancement of nonlinear effects via quantum interference, to the point where two beams with less than one photon on average have a measurable effect on one another.

17:00
WR2 (Invited) • Complementarity and simultaneous measurement of discrete-valued observables, A.Trifonov, G.Björk, J.Söderholm, *Royal Inst. of Technology (KTH), Sweden.* True simultaneous measurements of complementary quantum observables are discussed both theoretically and experimentally. The main focus is placed on the observables with a discrete spectrum in addition to the previous theoretical treatment of Arthurs and Kelly.

Hall 4

16:30–18:30
WS • Lasers in Chemistry, Biophysics, and Biomedicine IV
A.Yu.Chikishev, *Moscow State Univ., Russia, Presider*

16:30
WS1 (Invited) • Hemoglobin as nonlinear cooperative system: biophysical and biochemical problems of oxygenation and laser time-resolved spectroscopy, B.M.Dzhagarov, *Inst. of Mol. and Atomic Phys., Belarus.* A paper is presented of our current understanding of the mechanism and dynamics of hemoglobin oxygenation. The main topics are photophysics and photochemistry of different forms of hemoglobin, and a kinetic description of O_2 rebinding with heme iron.

17:00
WS2 (Invited) • New in biomechanics of blood circulation and possibilities of precision laser measurements, S.N.Bagayev, V.N.Zakharov, V.A.Orlov, *Inst. of Laser Physics, Russia.* The general physical mechanism of formation of the helical blood flow of biological media in canals of the cardiovascular, alimentary, and urinary-excretory systems has been decoded. The property of twisted blood flow in cone-shaped canals of blood vessels that determines the nature of intra-arterial diastolic pressure has been detected. The regularities of branching of

Hall 5

16:30–18:45
WT • Fundamental Aspects of Laser–Matter Interaction II
E.A.Manykin, *RRC "Kurchatov Institute", Russia, Presider*

16:30
WT1 (Invited) • Novel ways of creation of inversion population due to collisions and specific polarizations of radiation, A.M.Shalagin, *Inst. of Automation and Electrometry, Russia.* We show new abilities of collision processes in creation of inversely populated atomic transitions. Manipulation with polarization of pumping radiation provides some extra possibilities. The regime of frequency upconversion is possible. Two new phenomena have been observed.

17:00
WT2 • Laser-induced collective interactions under propagation of polychromatic radiation pulse through resonant optically dense extended medium without population inversion, S.N.Bagayev, *Inst. of Laser Phys., Russia,* V.S.Egorov, I.B.Mekhov, P.V.Moroshkin, A.N.Fedorov, I.A.Chekhonin, *St. Petersburg State Univ., Russia,* E.M.Davliatchine, E.Kindel, *Inst. of Low-Temp. Plasma Phys., Germany.*

Hall 1

WP • Physics of Nanostructures IV (Continued)

17:30
WP3 (Invited) • Optical and electronic properties of silicon nanocrystal assemblies, P.K.Kashkarov, V.Yu.Timoshenko, *Moscow State Univ., Russia.* Assemblies of Si nanocrystals (SNs) are investigated by photoluminescence, linear and nonlinear optical methods. Photoluminescence of SNs is controlled by quantum and dielectric confinements. An anisotropy of spatial distribution of SNs leads to strong birefringence, which is very promising for applications.

Hall 2

Hall 3

WR • Symposium on Entangled states IV (Continued)

17:30
WR3 (Invited) • Quantum tomography of the polarization state of light, A.V.Masalov, *Lebedev Phys. Inst., Russia.* The method of polarization tomography is applied in the experimental study of quantum state of unpolarized light generated by optical parametric oscillator. In the space of Stokes observables the quantum uncertainty body is 20% squeezed.

Hall 4

WS • Lasers in Chemistry, Biophysics, and Biomedicine IV (Continued)

blood vessels have been established. The possibility of elucidating the physical mechanisms of microcirculation and trans-capillary exchange with the use of the laser method is discussed.

17:30
WS3 (Invited)• Application of gradient laser fields in biology ad medicine (physical principles and prospects), A.N.Rubinov, A.A.Afanas'ev, *Stepanov Inst. of Phys., Belarus.* Influence of gradient electromagnetic fields created due to speckle formation at use of coherent light or by interference of laser beams on the functioning biological systems such as living cells, enzymes and others is discussed.

Hall 5

WT • Fundamental Aspects of Laser–Matter Interaction II (Continued)

17:15
WT3 • Short pulses generation due to coherent population trapping, R.Kolesov, O.Kocharovskaya, *Inst. of Appl. Phys., Russia.* We propose a novel technique of ultra short pulse production based on the generation of wide comb of Stokes and anti-Stokes waves due to the existence of spin coherence via coherent population trapping.

17:30
WT4 • Coherent transients in molecular gases, N.N.Rubtsova, *Inst. of Semicond. Phys., Russia.* Comparative analysis of two approaches used for the formation of coherent transients shows significant difference in the properties of coherent responses, which may be crucial for the choice of application area of these phenomena.

17:45
WT5 • Atom in a resonant elliptically polarized field: The exact stationary solution, A.V.Taichenachev, A.M.Tumaikin, V.I.Yudin, *Novosibirsk State Univ., Russia,* G.Nienhuis, *Univ. of Leiden, The Netherlands.* We present an analytical expression for the steady-state density matrix of atoms for all closed dipole transitions in elliptically polarized light. The solution is given in an invariant form, and is valid for arbitrary values of atomic momentum and arbitrary field intensity and detuning.

Hall 1 | Hall 2 | Hall 3 | Hall 4 | Hall 5

WP • Physics of Nanostructures IV (Continued)

18:00
WP4 • Nonlinear-optical study of local and nonlocal responses of nanostructured silver composites, V.P.Drachev, S.V.Perminov, E.N.Khaliullin, *Inst. of Semicond. Phys., Russia,* S.G.Rautian, V.P. Safonov, *Inst. of Automation and Electrometry, Russia.* Joint manifestation of local and nonlocal optical cubic response in aggregated silver colloid was studied theoretically and experimentally. The size of the aggregates is shown to have a strong influence on the nonlocal nonlinearity.

18:15
WP5 • Nonlinear optical properties of phosphate glasses doped with PbSe quantum dots, A.M.Malyarevich, V.G.Savitski, N.N.Posnov, K.V.Yumashev, *Int. Laser. Center, Belarus,* A.A.Lipovskii, *St. Petersburg State Tech. Univ., Russia.* Differential absorption spectra for PbSe QD-doped phosphate glasses were analyzed, saturation intensities and ratios of the excited state absorption to the ground state absorption cross section at 1.54 μm were estimated.

WS • Lasers in Chemistry, Biophysics, and Biomedicine IV (Continued)

18:00
WS4 • Visualization of intracellular Ca^{2+} dynamic with third harmonic generation microscopy, L.Canioni, S.Rivet, L.Sarger, R.Barille, P.Vacher, P.Voisin, *CNRS UMR, France,* Measurements by laser scanning third harmonic generation microscopy of Ca^{2+} dynamic release from internal stores and/or calcium influx in biological cells is presented. The Ca^{2+} signal consists of a transient increase in the intracellular concentration.

18:15
WS5 • Raman background decay in aqueous solutions of plant toxins and human blood serum, N.N.Brandt, N.B.Brandt, A.Yu.Chikishev, *Moscow State Univ., Russia,* M.G.Gangardt, N.F.Karyakina, *Russian Academy of the Adv. Medical Studies, Russia.* This work is aiming at explaining the photobleaching process in solutions of plant toxins and human blood serum. We also try to use the phenomenon of photobleaching to develop new method of early diagnostics of oncological diseases.

18:30
WS6 • Enzymatic and nonenzymatic photoinduced processes in membranes of laser irradiated cells, O.A.Tiphlova, *Inst. of Laser and Inform. Technologies, Russia.* The study of the kinetic curves reflecting action of pulsed near IR radiation on cells reveals that membrane diffusion appropriate for laser gene therapy is facilitated by enzyme local overheating at pulse durations more then 30 ms, or moderated by nonenzymatic singlet oxygen photoproduction at pulse durations less then 1 ms.

WT • Fundamental Aspects of Laser–Matter Interaction II (Continued)

18:00
WT6 • Novel Faraday mirror for high average power application, E.Khazanov, A.Anastasiyev, N.Andreev, O.Palashov, *Inst. of Appl. Phys., Russia.* A novel Faraday mirror is proposed and implemented that effectively operates even at significant heat release in the magneto-optical medium. It is shown that this mirror compensates birefringence in active laser elements with an accuracy of 1% at radiation power of 1kW.

18:15
WT7 • Prospects of VUV and X-ray laser on the effect of charge-transfer of laser-produced ions, S.N.Bagayev, A.G.Ponomarenko, I.F.Shaikhislamov, *Inst. of Laser Phys., Russia.*

18:30
WT8 • Ablation of metals by ultrashort laser pulses, I.N.Zavestovskaya, Y.V.Afanasiev, N.N.Demchenko, V.A.Isakov, *Lebedev Phys. Inst., Russia.* Metal ablation under the action of ultrashort laser pulses is studied numerically and analytically within a wide range of laser fluences ($1–10^4$ J/cm^2) and pulse durations ($0.1–10^4$ ps). The model involves a description of the phase transition "condensed matter–vapor." Analytical model for thermal and shock wave ablation regime description are proposed.

Hall 1	Hall 2	Hall 3	Hall 4	Hall 5

WS • Lasers in Chemistry, Biophysics, and Biomedicine IV (Continued)

18:45
WS7 • Collective librations in the LH2 antenna systems and modulated broadening of B800 and B850 absorption spectra, V.S.Pavlovich, *Inst. of Mol. and Atomic Phys., Belarus.*It is shown in terms of the *histons*, new quasi-particles, that the dipole librations in the antenna systems cause a high thermal broadening of the B800 and B850 spectra. The theory gives an excellent fit to *Rb. sphaeroides* and *Rps. acidophila* B800 known data at 4.2–270 K with an average histon frequency of 63 and 50 cm^{-1}.

18:30–20:00 Poster Sessions (in the foyers of the Halls 1,2, and 3 at the 3rd floor)

WU • Physics of Nanostructures

WU1 • Raman scattering cross section in trans-nanopolyacetylene, A.G.Smekhova, I.V.Golovnin, D.Yu.Paraschuk, *Moscow State Univ., Russia,* V.M.Kobryanskii, *Semenov Inst. of Chem. Phys., Russia.* The Raman crossection for trans-nanopolyacetylene at 514 nm was evaluated. It is ~105 times higher than that of $LiNbO_3$ crystal. The nature of high Raman activity of trans-nanopolyacetylene is discussed.

WU2 • Influence of oxidation on process of particle emission from silicon surface at solid-phase laser destruction, A.F.Banishev, V.S.Golubev, A.Yu.Kremev, *Inst. on Laser and Inform. Technologies, Russia.* We study particle emission that accompanies the destruction of monocrystalline silicon surface in the solid-phase with submicrosecond pulses of YAG:Nd lasers. The influence of surface oxidation on processes of destruction and particle emission is under investigation.

WU3 • Theory of laser-induced surface periodic temperature-deformational structures formation in solids, K.I.Eriomin, *Moscow State Univ., Russia.* The general theory of laser-induced selforganization of surface spatially periodic temperature-deformational (TD) structures in solids is developed. Based on this theory the geometries, periods, and times of formation of structures are determined in versus laser-induced temperature and crystalline symmetry of the surface. The theory predicts formula for the TD-structure period proportional to the square root of laser pulse duration in accordance with experiments.

WU4 • Formation of Si nanocrystals in a-Si films using excimer laser, V.A.Volodin, M.D.Efremov, S.A.Kochubei, A.K.Gutaovskii, L.I.Fedina, *Inst. of Semicond. Phys., Russia,* V.V.Bolotov, *Inst. of Sensor Microelectr., Russia,* A.V.Kretinin, *Novosibirsk State Univ., Russia.* Selforganization of nanocrystals in a-Si films under excimer laser treatments were studied using Raman spectroscopy and electron microscopy. Dependence of nanocrystal size, concentration and orientation on parameters of laser treatments was studied.

WU5 • Optical size resonances in atomic nanostructures, O.N.Gadomsky, T.T.Idiatullov, *Ulyanovsk State Univ., Russia,* Yu.Yu.Voronov, *Inst. of Radio Engin. and Electronics, Russia.* The possibility of existence of optical linear and nonlinear size resonances in two-atom nanostructures (for instance, in dimers on the surface of solids) is demonstrated. It is shown that resonances are arisen because of dipole-dipole interaction of two-level atoms. The properties of these resonances are strongly determined by parameters of incident light wave.

WU6 • Effect of Coulomb charging energy on electron oscillations in a coupled-quantum-dot structure, P.I.Khadzhi, V.I.Gnatyshchak, *Dniester State Univ., and Inst. of Appl. Phys., Moldova.* The effect of the Coulomb charging energy on the time evolution of the electron occupation probability in a coupled-quantum-dot system is investigated by use the nonlinear coupled equations, derived from the Schrödinger equation taking into account the Coulomb blockade of the resonant electron tunneling.

WU7 • Two-quantum relaxation of impurity in photonic crystal, A.M. Basharov, *Moscow Engin. Phys. Inst., Russia.* The attention is pointed out to some new channels of energy level relaxation of impurity in external coherent wave. These channels determine new optical effects such as electric-induced transparency and hole burning, and influence the dynamic of localized photon mode near the impurity. They are essential in photonic crystal with both full band gap and when there is no full band gap.

WU8 • Laser diagnostics of inhomogeneous nanometer-scale films by differential reflectivity and ellipsometry, P.V. Adamson, *Univ. of Tartu, Estonia.* A number of novel potentialities are shown for unambiguous determination of the thickness and refractive index of nanometric dielectric films on transparent or absorbing substrate. For transparent systems we have discovered for the first time a reflectance method whose sensitivity is in principle the same as that of ellipsometry.

WU9 • "Configurational resonances" phenomena in optical scattering spectroscopy of nanoobjects, S.G.Moiseev, *Military Commun. Univ., Russia.* The near-field interaction between the dipole atoms of a nano-sized object can give rise to a dramatic modification of the total polarizability. It is demonstrated that the frequency dependence of the scattered light intensity detected in the far-field zone is related to the configuration of nanoobject.

WU10 • Strong Faraday effect in trans-nanopolyacetylene, A.K.Vereshchagin, V.A. Rullova-Zavgorodniy, D.Yu.Paraschuk, *Moscow State Univ., Russia,* V.M.Kobryanskii, *Semenov Inst. of Chem. Phys., Russia.* We report on a strong Faraday effect in trans-nanopolyacetylene at room temperature. The Verdet constant of polyacetylene nanoparticles is 300–400 times higher than that of saturated polymers. The nature of high magnetooptic activity is discussed. Thus, the (CH)x nanoparticles give a two order higher magnetooptic response than that for saturated polymeric materials.

WU11 • Nano: tubes; electronics; optics, B.A.Akanaev, B.A.Baitimbetova, M.A. Bijsenbaev, Z.A.Mansurov, *Kazakh State Univ., Kazakhstan.* We obtain, the nanotubes with the transversally stacked atoms of substances can be for electronic nanocircuits. The possible technological, electronic and optical solutions of three-dimensional systems argued.

WU12 • Photothermal probing of Ag states of nanopolyacetylene in the transparency range, N.V.Chigarev, V.A. Ruilova-Zavgorodniy, D.Yu.Paraschuk, *Moscow State Univ., Russia,* V.M. Kobryanskii, *Semenov Inst. of Chem. Phys., Russia.* Dipole-forbidden states of nanopolyacetylene were probed by a photothermal method. The spectrum of low absorption of trans-nanopolyacetylene in the transparency range was obtained. The absorption coefficient was evaluated as $\sim 0.1 cm^{-1}$ at 1064 nm.

WU13 • Gain effects in 1-D photonic band-gap structure, L.A.Melnikov, O.N. Kozina, *Saratov State Univ., Russia,* I.S.Nefedov, S.V.Romanov, *Saratov Div. of the Institute of Radio-Engin. and Electronics, Russia.* The gain factor enhancement in active photonic band-gap (PBG) structure is shown to exist mainly due to field distribution tailoring. The effect of gain on PBG was numerically investigated including gain saturation effect.

WU14 • Low-frequency Raman spectroscopy of polymer nanoclusters with fractal dimension, A.M.Saletsky, A.V. Chervyakov, *Moscow State Univ., Russia.* Using laser low-frequency Raman spectroscopy, the structure of aqueous solutions of polyacrylic acid as a function of polyelectrolyte concentration and chain length was studied. The fractal dimension and size of these structures was determined.

WU15 • Binary coherent interactions in planar partially ordered metal-dielectric nanostructures, R.A.Dynich, *Belarusian State Univ. of Informatics and Radioelectronics, Belarus,* A.N.Ponyavina, S.M.Kachan, *Inst. of Mol. and Atomic Phys., Belarus,* A.Ja.Khairullina, *Stepanov Inst. of Phys., Belarus.* Polarization and coherent effects for partially ordered planar metallic nanostructures have been investigated within the framework of the model of binary interactions. Frequency dependence of a plasmon resonance on polarization state and effect of a packing density on the resonance spectral displacement have been established.

WU16 • Optical anisotropy of nanostructured silicon films studied by FTIR spectroscopy, L.P.Kuznetsova, A.I.Efimova, L.A.Golovan, V.Yu.Timoshenko, P.K. Kashkarov, *Moscow State Univ., Russia.* Anisotropic nanostructured silicon films were investigated by Fourier transform infrared (FTIR) spectroscopy. The spectra exhibit beats arisen from the existence of two principal in-plane directions with different refractive indices. The difference between ordinary and extraordinary refractive indices was estimated.

WU17 • Phase matching second-harmonic generation in anisotropic porous silicon, L.A.Golovan, V.Yu.Timoshenko, A.B.Fedotov, D.A.Sidorov-Biryukov, P.K. Kashkarov, A.M.Zheltikov, *Moscow State Univ., Russia,* D.Kovalev, N.Künzer, G.Polisski, J.Diener, F.Koch, *Tech. Univ. München, Germany.* Second-harmonic generation is investigated in porous-silicon layers exhibiting strong in-plane birefringence. The experiments have revealed phase-matching conditions for wave interaction. The conditions could be controlled by rotation of the sample and filling the pores with a dielectric liquid.

WU18 • Multicomponent one-dimensional photonic band-gap structures: dispersion relations and extended phase-matching abilities, A.N.Naumov, A.M.Zheltikov, *Moscow State Univ., Russia,* J.W.Haus, *Univ. of Dayton, USA,* M.Bertolotti, C.Sibilia, *Univ. di Roma "La Sapienza", Italy.* Multicomponent 1D photonic band-gap structures, i.e., structures obtained by periodically translating a unit cell consisting of many dielectric layers with different refractive indices, are demonstrated to provide additional degrees of freedom in dispersion control relative to conventional binary 1D PBG structures.

WU19 • Interferometric second-harmonic spectroscopy of porous silicon photonic crystals, T.V.Dolgova, M.G. Martemyanov, A.A.Fedyanin, O.A.Aktsipetrov, *Moscow State Univ., Russia,* D.Schuhmacher, G.Marowsky, *Laser-Lab. Goettingen, Germany,* V.A.Yakovlev, *Inst. of Spectroscopy, Russia,* G.Mattei, *Istituto di Metodologie Avanzate Inorganiche, CNR, Italy.* The combined second-harmonic intensity and phase spectroscopy is proposed as a nonlinear-optical probe of photonic effects in microcavities and photonic crystals.

WU20 • Photoluminescence of silicon nanocrystals in weak confinement regime, M.G.Lisachenko, V.Yu.Timoshenko, V.A.Bazylenko, E.A.Konstantinova, P.K.Kashkarov, *Moscow State Univ., Russia.* Photoluminescence of Si nanocrystals with diameters larger than 5 nm is investigated at different temperatures and intensities of laser pumping. The super-linear dependence of photoluminescence intensity on power of excitation is observed.

WU21 • Semiconductor nanostructures for quantum wire laser, D.Piester, A.S.Bakin, H.-H.Wehmann, A.Schlachetzki, *Inst. für Halbleitertechnik, Germany.* We realized InGaAs/InP quantum wires (QWRs) on V-groove patterned substrates. Such a QWR is used as an active region in a laser device. We optimized the carrier injection into the active region employing quantum-size effects.

WU22 • A photonic band-gap planar hollow waveguide, A.B.Fedotov, A.N. Naumov, D.A.Sidorov-Biryukov, N.V. Chigarev, A.M.Zheltikov, *Moscow State Univ., Russia,* J.W.Haus, *Univ. of Dayton, USA,* R.B.Miles, *Princeton Univ., USA.* A combination of a diffraction grating and a mirror is shown to allow a hollow wavegudie and a photonic band-gap structure to be integrated into a compact optical element, offering much promise for various applications in nonlinear and ultrafast optics.

WU23 • Size effects on optical properties of Lu_2O_3:Eu^{3+} nanocrystallites, W.Strek, D.Hreniak, J.Hanuza, *Inst. for Low Temper. and Struct. Res., Poland,* E.Zych, *Univ. of Wrocław, Poland,* R.Acevedo, *Univ. de Chile, Chile.* The luminescent properties of nanocrystalline Eu-doped Lu_2O_3 prepared via combustion synthesis are reported. Depending on the fuel used the products were characterized by different size of the crystallites. The IR, Raman and emission spectra were measured for both types of materials. A significant influence of the crystallites size on the measured properties was observed. Hence, excitation and emission spectra exhibit a significant change in the line width. Such behavior may indicate a varying strength of electron-phonon coupling with the changes of nanoparticle sizes.

WU24 • Excitation of waveguide modes in one-dimensional photonic crystal, A.V.Andreev, A.B.Kozlov, *Moscow State Univ., Russia.* It is shown the possibility of waveguide mode excitation in process of four-wave mixing $\omega_3=\omega_1+\omega_1-\omega_2$ in one-dimensional photonic crystal. The significant increase in the field amplitude inside the structure under resonant condition of the waveguide mode excitation is demonstrated. The practical applications of the effect are discussed.

WU25 • Nonlinear refraction in the GaAs quantum wells, V.K.Kononenko, V.I.Tsvirko, *Stepanov Inst. of Phys., Belarus.* Dependence of the nonlinear refraction coefficient on light intensity in the GaAs-AlGaAs quantum-well system has been established. Effects of spectral broadenong and light polarization are taken into account in calculations based on the Kramers-Krönig relation.

WU26 • Optical properties of fractal Cantor-like multilayer nanostructures, K.S.Sandomirski, S.V.Gaponenko, *Inst. of Mol. and Atomic Phys., Belarus,* S.V.Zhukovsky, A.V.Lavrinenko, *Belarusian State Univ., Belarus.* Optical properties of fractal Cantor-like multilayer structures are investigated theoretically and experimentally. The structures are shown to exhibit distinct optical properties, such as existence of band gaps and sharp resonances (peaks) in transmission spectra. Connection between the stack geometry and optical properties is found, namely spectral scalability and sequential splitting.

WU27 • Spectral-angular and threshold characteristics of ultraviolet-blue In(Al)GaN/Al_2O_3 heterostructure lasers, G.P.Yablonskii, E.V.Lutsenko, V.Z.Zubialevich, V.N.Pavlovskii, I.P.Marko, A.L. Gurskii, *Stepanov Inst. of Phys. Belarus,* O.Schön, H.Protzmann, M.Lünenbürger, B.Schineller, M.Heuken, *AIXTRON AG, Germany.* Influence of layer thickness, heterostructure design, optical confinement factor and spontaneous emission efficiency on laser parameters of the GaN based quantum well optically pumped lasers is studied in wide spectral, temperature and excitattion intensity regions.

WU28 • Second harmonic generation in photonic band gap structures with GaAs, R.G.Zaporozhchenko, S.Ya.Kilin, *Stepanov Inst. of Phys., Belarus.* The results of numerical simulations of the Second Harmonic Generation in photonic band gaps structures of GaAs crystal and dielectric quarter-wave layers with different of indexes of refraction under of femtosecond pulse pump are presented.

WU29 • Electroabsorption of an ensemble of close-packed CdSe quantum dots, L.I.Gurinovich, *Inst. of Mol. and Atomic Phys., Belarus,* M.V.Artemyev, *Belarussian State Univ., Belarus.* Electroabsorption of close-packed CdSe quantum doq ensemble was studied. Bias free broadening and red shift of optical transitions in close-packed ensemble versus isolated is attributed to the formation of collective electronic subminibands. The reversible collapse of this subminibands has been acheved by applying of strong electric field to the close-packed ensemble.

WU30 • Weak photonic crystals for soft x-rays, E.P.Petrov, *Stepanov Inst. of Phys. Belarus,* D.A.Ksenzov, *Inst. of Mol. and Atomic Phys., Belarus.* Gas-bubble superlattices formed in metals upon implantation of inert gas ions are treated for the first time as weak photonic crystals for soft x-rays. Results of numerical simulations of the x-ray reflectivity of a He-bubble superlattice in Mo are presented.

WU31 • Formation and deposition of nanostructured powders by double pulse laser ablation technique, V.A.Ageev, V.S.Burakov, A.F.Bokhonov, V.N.Kovalevskiy, M.I.Nedel'ko, V.A.Rozantzev, N.V.Tarasenko, *Inst. of Mol. and Atomic Phys., Belarus.* A fabrication of metallic nanosized powders with a narrow size distribution by double pulse laser ablation method is described. The correlation between the emission characteristics of ablated plume and properties of deposited powders is discussed.

WU32 • Nonlinear optical properties of copper selenide nanoparticles in sol-gel glasses, P.V.Prokoshin, K.V.Yumashev, S.A.Zolotovskaya, N.N.Posnov, *Int. Laser Center, Belarus,* V.S.Gurin, *Phys.-Chem. Res. Inst., Belarus,* V.B.Prokopenko, A.A. Alexeenko, *Gomel State Univ., Belarus.* The bleaching recovery time of oxidized copper selenide nanoparticles in sol-gel glasses vary from 130 ps to 1.4 ns. Intensity-dependent transmission of the oxidized Cu_xSeNP's in sol-gel glasses has been measured at different laser wavelength.

WU33 • Chemical modification of surface and optical properties of composite semiconductor nanoparticles (CdSe)ZnS, N.D.Strekal, M.V.Artemyev, A.A.Maskevich, S.A.Maskevich, I.R.Nabiev, *Grodno State Univ., Belarus.* The calculated radial distribution of charge carriers wave function for chemically modified (CdSe)ZnS nanocrystals is compared with measured photoluminecnce

quantum yield η. The ways for η increase in such nanocrystals are discussed.

WU34 • Intracavity fabrication of nanostructures on bulk materials, V.Osipov, V.Valyavko, *Stepanov Inst. of Phys., Belarus.* The analytical and experimental investigations describing the intracavity processing of different solid-state materials (Al, Cr, Ge, Si) are presented. New designs of the laser cavity were explored to facilitate the fabrication of structures composed of a system of equidistant parallel 25nm-sized drooves and periodic microdots on massive samples of metals and semiconductors, as well as micro-holes in thin metallic samples.

WU35 • Optical properties of ultra-disperse diamonds in aqueous suspensions, A.V.Gubarevich, A.Ya.Khairullina, T.M.Gubarevich, V.A.Lapina, *Stepanov Inst. of Phys., Belarus.* It is shown the possibility of application the single-light-scattering method to investigation of the ultra-disperse diamond aqueous suspension optical properties. The imaginary and real parts of the complex refractive index of two UDD modifications were calculated.

WV • High-Precision Measurements in Optics

WV1 • Holographic interferometry of a conducting surface using surface-plasmons, A.K.Nikitin, A.P.Loginov, N.I. Golovtsov, *Peoples' Friendship Univ., Russia.* The possibility of studying a conducting surface by the method of optic holographic interferometry (HI) performed under the conditions of surface-plasmon resonance is considered. Surface plasmons (SP) are excited by the probing light both in reconstruction and recording procedures. This enables one to investigate fast processes on the surface combining the advantages of HI and SP-microscopy.

WV2 • Interferometry based on autodyne detection in semiconductor laser, D.A.Usanov, A.V.Skripal, M.Yu.Kalinkin, *Saratov State Univ., Russia.* The theoretical and experimental researches of the autodyne signal forming in semiconductor laser for the harmonical and complicated periodical vibrations of the external reflector have been performed. The character of autodyne signal form depedence on the feedback level and stationary phase has been investigated. The application of laser autodyne interferometry in biology and medicine has been shown.

WV3 • Mensuration of the spectral modulated interferograms by the iterative phase-locked loop method, I.Gurov, V.Chugunov, *Inst. of Fine Mech. and Optics, Russia,* P.Hlubina, *Silesian Univ. at Opava, Czech Republic.* New approach for analyzing channeled spectrum obtained at the output of low-coherent interferometer with a subsequent spectrometer is developed. Spectral fringe profile is enhanced, unwrapped spectral fringe phase is recovered and group optical path difference is measured.

WV4 • Theory of Doppler-free spectroscopy with λ-thick vapor cells, A.N. Naumov, A.A.Podshivalov, K.N.Drabovich, A.M.Zheltikov, *Moscow State Univ., Russia,* R.B.Miles, *Princeton Univ., USA.* The influence of the sizes of a vapor cell on the shape of the spectral contour of the linear susceptibility is analyzed. The possibility of using λ-thick vapor cells, as well as one- and two-dimensional photonic band-gap structures for high-resolution measurements is discussed.

WV5 • Shot-noise limit sensitivity in CW pump-probe spectroscopy of conjugated polymers, V.A.Ruilova-Zavgorodniy, O.Yu.Nedopekin, S.G.Elizarov, D.Yu. Paraschuk, *Moscow State Univ., Russia.* We improved the sensitivity by a few orders of magnitude in several cw pump-probe spectroscopy methods of conjugated polymers. We used as a probe diode lasers with active/passive stabilization, incandescent lamps and light emitting diodes.

WV6 • Narrow resonances of the saturated absorption and dispersion, T.V.Radina, *St.-Petersburg State Univ., Russia.* We have discussed here a new approach to a genesis of resonances of waves intensities which one are accompanied by the index of refraction resonances at their passage in nonlinear gas medium.

WV7 • The function of diffraction in intracavity spectroscopy and metrology problems, T.V.Radina, A.F.Stankevitch, *St.-Petersburg State Univ., Russia.* An allowance for the multiplicative effect of the active medium and of the aperture explains the asymmetric nature of the frequency shift and losses and hence also of the intensity and Lamb dip relative to the central transition frequency.

WV8 • Calculations of second-harmonic near-field images, S.Bozhevolnyi, *Aalborg Univ., Denmark,* V.Lozovski, *Inst. of Semicond. Phys., Ukraine.* The near-field images of nonlinear nano-object situated at the surface of nonlinear substrate are calculated for different polarization configurations. The new approach to solution of microscopic selfcosistent field equation of Lippmann-Schwinger type was developed. The calculations were implemented to scanning optical near-field microscopy with Gaussian beam illumination.

WV9 • Restoration of the autocorrelation function of a statistic surface roughness on the light scattering in a planar optical waveguide in the presence of the additive stochastic noise, A.A.Yegorov, *Peoples' Friendship Univ. of Russia, Russia.* The problem of the TE-mode scattering in an integrated optical waveguide with small statistical irregularities is described. The possibility to restore the autocorrelation function of surface roughness from scattering diagram in far zone is demonstrated.

WV10 • Real time waveguide acoustooptical optic radiation spectrum analyser, A.G.Sobolev, E.N.Epikhine, N.V.Masalsky, V.A.Volkov, *Inst. for Microprocessors, Russia.* Elaboration of the waveguide acoustooptical optical radiation spectrum analyzer construction, its computer simulation, manifacturing of the device sample and investigation of its characteristics have been done during the work. Theoretical resuls and obtained experimental data are well correlated.

WV11 • Thermal wave phase and amplitude measurements of thin metal films thickness, A.V.Reznikov, *Laser-Compact Co. Ltd., Russia.* It has been shown that in case of low frequency modulation of heating radiation, amplitude technique is more sensitive for thermal wave measurements of thin metal film thickness onto dielectric surface compared with phase technique.

WV12 • Forming of the long holographic lattices with the use of frequency shift of the light bundles, which interferes, V.A.Pilipovich, V.F.Yarmolitski, V.I.Polyakov, A.I.Konojko, *Inst. of Electronics, Belarus.* The method of forming of diffractional lattice with the use of polarization-frequency transformation of light fluxes, which are realized by electrooptics aids, is considered.

WV13 • Determination of parameters on nanolayers by the modified Kretchman's scheme, V.A.Karpenko, A.A.Romanenko, *Inst. of Appl. Optics, Belarus.* It is shown that modification of Kretchman's scheme by deposition of the dielectric thin film on the metal one allows the device sensitivity to adsorbed layers to be increased. An analytical solution of the inverse problem of the adsorbed layer parameter determination is obtained.

WX • ISTC Workshop

WX1 • High power laser diode arrays on diamond heat sinks, L.E.Batay, A.N. Kuzmin, N.K.Nikeenko, V.V.Paraschuk, G.I.Ryabtsev, *Stepanov Inst. of Phys., Belarus.* Possibility of decreasing of laser diode array thermal resistance and an increase in an output radiation power by applying the diamond heat sinks on the base of «Almazot»-type synthetic substrates metallized with using the high adhesive Ti-Ni coating layers has been demonstrated.

WX2 • Crystal growth for IR-range lasers, V.N.Matrosov, T.A.Matrosova, E.V.Pestryacov, V.V.Petrov. *Belarussian State Polytech.Academy, Belarus.* According to ISTC B-263 Project it's planned to accomplish the works of growing $BeAL_6O_{10}:Cr^{3+}$ and $BeAL_2O_4:Cr^{3+}$ high quality crystals. Both crystals are very prospective for application in tunable lasers with diode pumping as well as with lamp pumping. On the base of these crystals a new hybrid laser can be created, which generate from 0.7 to 1 μm.

WX3 • Development of the compact IR gas lasers, L.N.Orlov, O.L.Gaiko, J.I.Necrashevich, V.V.Nevdakh, V.V.Churakov, V.A.Gorobetz, V.O.Petuchov, V.M. Yasinskii, V.G.Gudelev, Ju.P.Zhurik, *Stepanov Inst. of Phys., Belarus.*

WX4 • Dynamics of a laser with nonlinear internal reflection in a resonator, A.N. Rubinov, I.M. Korda, *Stepanov Inst. of Phys., Belarus.* Computer calculations and experimental results on investigation of dynamics of nonlinear internal reflection at the border of transparent dielectric and absorbing liquid in a laser resonator with the regard for thermal conductivity are presented.

WX5 • Two-color automated gas laser for IR lidar tuned over broad spectral range, I.M.Bertel', *Medical Inst., Grodno, Belarus,* V.V.Churakov, V.O.Petukhov, *Stepanov Inst. of Phys., Belarus.* The purpose is development, production and testing as lidar part of two-color automated pulse-periodic gas laser, oscillating simultaneously ore with prescribed delay (up to several microseconds) on any two given transitions of molecular (CO_2, CO, N_2O) and noble (Xe, Kr, Ar, Ne) gases in the range of 1–12 μm.

WX6 • Elaboration of physical foundations and technologies to make low-voltage light modulators by polymer dispersed liquid crystal monolayers with interference enhancement of contrast ratio, V.A.Loiko, A.V.Konkolovich, V.Ya. Zyryanov, A.V.Shabanov, V.V.Presnyakov, *Stepanov Inst. of Phys., Belarus.*

WX7 • The development of optical methods and devices for diagnostics of gaseous fuel combustion products, N.K.Tolochko, K.I.Arshinov, I.A.Yadroitsev, N.S.Leshenyuk, N.V.Sobolenko, A.Z. Myaldun, V.V.Nevdakh, V.G.Gudelev, L.N.Orlov, Yu.P.Zhurik, S.A.Labuda, O.V. Achasov, O.G.Penyazkov, *Stepanov Inst. of Phys., Belarus.*

WX8 • Growth and properties of activated berillium hexaluminate crystals, V.N.Matrosov, T.A.Matrosova, E.V.Pestryacov, V.V.Petrov, *State Polytech. Academy, Belarus.*

WX9 • New concept for the compact SSDPL development, L.N.Orlov, *Stepanov Inst. of Phys., Belarus.*

WX10 • Relaxation processes at IR multiple-photon excitation of polyatomic triplet molecules, G.A.Zalesskaya, D.L.Yakovlev, E.G.Sambor, D.V.Prikhodchenko, *Inst. of Mol.r and Atomic Phys., Belarus.*

WX11 • Control of chemical reactions and lasing at selective excitation of substance in meso cavities and aerosols, L.G.Astafieva, L.A.Kotomtseva, G.P.Lednyeva, G.K.Paramonov, V.A.Savva, *Stepanov Inst. of Phys., Belarus.*

WX12 • Laser spectroscopy of polarized fluorescence of jet cooled indole, V.A.Povedailo, V.A.Tolkachev, *Inst. of Mol. and Atomic Phys., Belarus.* The polarization of laser induced fluorescence of jet cooled indole molecules and argon, alcohol-containing indole complexes excited selectively in a rotational contour of an electronic 0–0 exciting line is measured. The polarization data allow us to determine molecular orientation of the transition dipole moment. This shows that the polarization of excited in the Q-band fluorescence is more sensitive to the molecular structure then that excited into P- and R- bands.

WX13 • Dynamics of intermolecular hydrogen bond formation for 8-azasteroid biomolecules, O.V.Buganov, V.A.Ksenzov, A.L.Mikhalchuk, S.A.Tikhomirov, G.B.Tolstorozhev, *Inst. of Mol. and Atomic Phys., Belarus.*

WX14 • Femtosecond rotational dynamics of free polyatomic molecules in a gas phase, A.P.Blokhin, M.F.Gelin, E.V.Khoroshilov, I.V.Kryukov, A.V.Sharkov, S.A.Tikhomirov, *Inst. of Mol. and Atomic Phys., Belarus.*

WX15 • Mesoscopic light emitters, switches, and transformers, S.V.Gaponenko, A.N.Ponyavina, G.E.Malashkevich, *Inst. of Mol. and Atomic Phys., Belarus.* In mesoscopic structures with topological peculiarities on a length scale of the order of photon and electron wavelengths properties of matter and field-matter interaction are significantly modified. The objective of the project is the use of mesoscopic optical phenomena for the development of novel efficient light emitters, switches, and transformers.

WX16 • Lidar analytical modelling to include multiple scattering and polarisation and a study of the retrieval capabilities of ocean lidar, E.P.Zege, I.L.Katsev, A.S.Prikhach, *Stepanov Inst. of Phys., Belarus.* A new semi-analytical theory of the airborne oceanic lidar system return will be developed. This theory will include polarisation and multiple scattering and directly relate lidar returns to vertical profiles of the inherent optical properties of ocean water.

WX17 • Rotational diffusion of dye molecules in water-electrolyte solutions, B.Bushuk, A. Rubinov, Yu. Kalvinkovskaya, S. Bushuk, *Stepanov Inst. of Phys., Belarus.* Microstructure of 6-aminophenalenone solvate shell in water and buffer solutions is investigated by steady state and picosecond polarization spectroscopy methods. Influence of ion characteristics on solvate shell formation is established.

WX18 • Optical formation of spatial gratings with a linearly chirped period, T.Sh.Efendiev, V.M.Katarkevich, A.N.Rubinov, *Stepanov Inst. of Phys., Belarus.* It is well known that if a polarizable particle is placed into a spatially-modulated laser field it is affected by gradient forces. As a result depending on the sign of the polarizability a particle is pulled up or pushed out from the region of light field maximum. The influence of gradient laser field on the particles of the same size should depend on the period of the field spatial modulation.

WX19 • Fast decay of photoinduced anisotropy for aromatic and biological molecules in dense gases, N.A. Borisevich, A.P.Blokhin, O.V.Buganov, V.L. Dubovsky, M.F.Gelin, S.A.Tikhomirov, G.B.Tolstorozhev, *Inst. of Mol. and Atomic Phys., Belarus.* Femto- and picosecond experiments on optically induced anisotropy decay kinetics for perylene, POPOP, and indole molecules in vapors with the environment density varying from the rare gas to the near-liquid limit have been fulfilled. Collisional depolarization is analyzed in the framework of different models: J- and M-models, Keilson-Storer model and rigid body collision dynamics.

WY • Fundamental Aspects of Laser–Matter Interaction

WY1 • Chaotic absorption of coherent laser light by an anharmonic molecule, S.V.Prants, M.Yu.Uleysky, *Pacific Oceanological Inst., Russia.* Nonlinear dynamics of anharmonic quantum oscillator with few degrees of freedom, forced by a periodic laser field, is studied. It is found numerically that the anharmonic molecule may absorb chaotically up to ten of laser photons. We elucidate and study the mechanism of chaotic multiphoton absorption, which may lead to ultrafast dissociation of real molecules.

WY2 • New nonlinear optical effect: Self-reflection phenomenon due to exciton-biexciton-light interaction in semiconductors, P.I.Khadzhi, K.D.Lyakhomskaya, L.Yu.Nadkin, D.A.Markov, *Dniester State Univ., Inst. of Appl. Phys., Moldova.* The multivalued reflectivity of a semiinfinite crystal in the exciton range of spectrum is investigated in detail beyond the slowly varying envelope approximation. The investigated self-reflected phenomenon is due to the appearance of backward propagating wave on the sharp gradients of nonlinear reflective index.

WY3 • Influence of strong laser radiation on the photoelectric properties and charge transfer of ZnP_2 and CdP_2, S.I.Beril, I.G.Stamov, S.Yu.Duboshevskii, V.V.Panasenko, *Dniester State Univ., Moldova.* We have investigated the influence of the laser radiation on the reflectivity spectra and charge transfer in anisotropic semiconductors and have modelled the physical processes taking into account the influence of the carrier trapping. We have investigated the tunnel charge transfer too.

WY4 • Coherent transients generated at molecular levels, dressed by electromagnetic field, N.N.Rubtsova, T.P.Konstantinova, *Inst. of Semicond. Phys., Russia.* Photon echo and free polarization decay in the gas $^{13}CH_3F$, generated by Stark switching technique, change their parameters versus intensity of CW exciting radiation because of the dynamic Stark effect.

WY5 • Nonlinear mechanisms of UV laser radiation absorption in CaF_2, P.B.Sergeev, *Lebedev Phys. Inst., Russia.* The results of numerical modeling of UV laser radiation interaction with CaF_2 are represented. It is a case, when is possible the photodissociation disorder of "molecular" V_k- and H-centers on two holes with the subsequent fast formation of two new V_k-centers. This mechanism gives sharp increase of nonlinear absorption for nanosecond laser pulses.

WY6 • Instability of light-driven convective motions, R.S.Akopyan, R.B.Alaverdyan, Yu.S.Chilingaryan, H.Ye.Seferyan, *Yerevan State Univ., Armenia.* We show experimentally and expound theoretically upon the possibility of excitation of convective motions and surface hydrodynamic waves via light with stationary and travelling spatially periodic intensity distributions. The stability of regular convective structures is studied in detail.

WY7 • Stochastic magnetic field induced Freederiksz transition in NLC, L.S. Aslanyan, V.B.Pakhalov, J.Ch.Grigoryan, *Yerevan State Univ., Armenia.* The present paper is devoted to the numerical research of dynamic behaviour of NLC molecules in an external stochastic magnetic field. We carried out the numerical modeling of the equation of motion of the NLC director. It is shown that, in spite of the chaotic change of the magnetic field, the reorientation of the director appears, i.e. it is possible the occurrrence of Freederiksz transition in a stochastic magnetic field.

WY8 • Modification of the Mössbauer spectra by means of polarization-selective optical pumping, R.Kolesov, E.Kuznetsova, *Institute of Applied Physics of RAS, Russia, and Texas A&M Univ., USA.* We show that due to specific selection rules for polarized light it is possible to achieve almost 100% nuclear polarization in solids by optical pumping despite large broadening of the optical line.

WY9 • Laser-induced transparency in the light-diffusing media, V.L.Komolov, S.G.Przhibel'skii, V.N.Smirnov, *Vavilov State Optical Inst., Russia.* We present the results of detailed analysis of a new class of the optical phenomena predicted by the authors—laser-induced homogenization of the light-diffusing media leads to an abrupt decrease of the light diffusion in condensed media under the intensive light action.

WY10 • Photorefraction scattering in $LiNbO_3$ crystals with different alloying additives, Yu.M.Karpets, V.A.Maksimenko, *Far Eastern State Transport Univ., Russia.* When comparing the photorefraction scattering in $LiNbO_3$:Rh and $LiNbO_3$:Fe it was established that a kind of additive has influence on both quantitative characteristics of the photorefraction scattering in lithium niobate and on its nature. The selective component in back scattering in $LiNbO_3$:Fe has been found.

WY11 • Coherent exchange between the forward and backward waves in induced superrediance, A.A.Bogdanov, A.I. Zaitsev, *Herzen Russian State Pedagogical Univ., Russia.* The generation of reflected and transmitted waves is investigated. It is demonstrated that the exponential increase of the total field at the linear stage may be accompanied by a periodic cooperative exchange between the forward and backward waves. Transition to the nonlinear stage in a certain phase of this exchange determines the predominance of the transmitted or reflected wave in the pulse.

WY12 • Investigation of Stark shift and shock waves papameters relationship in laser plasmas generated on the surfaces of solid targets, O.A.Bukin, A.A.Il'in, S.S.Golik, V.I.Tsarev, *Far Eastern State Univ., Russia.* Subject of the report is the experimental analysis of continuous spectra radiance dynamics in the different zones of the laser plume under various ambient gas pressures. Shock waves influence on the laser plasma parameters is investigated.

WY13 • Vibrationally induced transparency in optically dense resonance medium, Y.V.Radeonychev, M.D.Tokman, A.G.Litvak, *Inst. of Applied Physics, RAS, Russia,* O.Kocharovskaya, *Inst. of Applied Physics RAS and Texas A&M Univ., USA.* A novel method of resonant absorption suppression of monochromatic radiation via supersonic mechanical vibration of medium sample along radiation propagation is proposed. Steady-state field propagation without resonant absorption and appearance of spectral components is predicted.

WY14 • Hyper-Raman scattering by 2LO-photons in a CdS crystal, L.E.Semenova, K.A.Prokhorov, *General Phys. Inst., Russia.* The theory of the Hyper-Raman scattering (HRS) by 2LO-phonons in semiconductor crystals is developed. The scattering mechanisms of the HRS by 1LO- and 2LO-phonons in the CdS crystal are considered. The corresponding cross sections are estimated.

WY15 • Multiple scattering of powerful laser radiation, S.E.Skipetrov, *Moscow State Univ., Russia,* M.A.Kazaryan, *Lebedev Physical Inst., RAS, Russia.* Multiple scattering of a laser beam in a suspension of small spherical particles is considered with account for the laser-induced collective motion of particles. The time autocorrelation function of scattered light is shown to become intensity-dependent.

WY16 • Polarizability difference at the transition as a characteristic of Raman-active properties of a molecule, S.Yu.Nikitin, *Moscow State Univ., Russia.* Polarizability difference at the states, forming Raman-active transition, is

fouund to be a good characteristic of a molecule properties with respect to Raman scattering of light. Stimulated Raman gain and spontaneous Raman scattering cross-section are calculated throgh the polarizability difference.

WY16 • Polarizability difference at the transition as a characteristic of Raman-active properties of a molecule, S.Yu.Nikitin, *Moscow State Univ., Russia.* Polarizability difference at the states, forming Raman-active transition, is fouund to be a good characteristic of a molecule properties with respect to Raman scattering of light. Stimulated Raman gain and spontaneous Raman scattering cross-section are calculated throgh the polarizability difference.

WY18 • Influence of near-by level on the superradiance kinetics of a superthin film: Local field regime, A.I.Zaitsev, I.V.Ryzhov, *Herzen State Pedagogical Univ., Russia.* The influence of local field on competition between operating transitions in superradiance of the partially excited superthin film comprised by three-level atoms is investigated. We report the new regime of superradiance, where Raman transition leaves behind the pulse development.

WY19 • Laser measurements of collision-induced distortions of molecular polarizability in gaseous fluorides, A.P.Burtsev, I.M.Kislyakov, Yu.M.Ladvishchenko, Yu.M.Sveshnikov, *St-Petersburg State Univ., Russia.* For the first time extremely strong collision-induced distortions of vibrational molecular polarizability were observed in gaseous fluorides by laser interferometric method. The dispersion of the second refractivity virial coefficient of SF_6, CF_4 was studied.

WY20 • Optically induced polarization rotation and spontaneous coherence transfer in two-color laser spectroscopy of ^{87}Rb, V.M.Entin, I.I.Ryabtsev, A.E.Boguslavskiy, Yu.V.Brzhasovskiy, *Inst. of Semiconductor Physics, RAS, Russia.* Spontaneous coherence transfer has been studied experimentally using the two-color laser polarization spectroscopy of ^{87}Rb. Optically induced polarization rotation was measured in various schemes of optical transitions. An agreement with the theoretical predictions has been found.

WY21 • Damage threshold of nonlinear crystals at 9.55 μm, Yu.M.Andreev, L.G. Geiko, P.P.Geiko, *Inst. for Optical Monitoring SB RAS, Russia,* V.V.Badikov, *Krasnodar State Univ., Russia,* V.G.Voevodin, *Siberian Physics-Technical Inst., Russia,* M.V.Ivashchenko, A.I.Karapuzikov, I.V. Sherstov, *Inst. of Laser Physics SB RAS, Russia.* Damage thresholds of $CdGeAs_2$, $ZnGeP_2$, $AgGaSe_2$, GaSe, GaSe:In(0.5%), $HgGa_2S_4$, $AgGaS_2$, Ag_3AsS_3, and for the first time $AgGaGeS_4$ and $Cd_{0.35}Hg_{0.65}Ga_2S_4$ crystals are determined at identical experimental conditions with stable time shape-form, amplitude and pulse duration TEA CO_2-laser.

WY22 • The photon echo generated in thin-film cavity structures, V.A.Goryachev, S.M.Zakharov, *Inst. for Microprocessors, Russia,* E.A.Manykin, *RRC "Kurchatov Inst.", Russia.* The transmission of sequence with ultrashort light pulses through the resonant cavity structure is considered. The features of the Photon Echoes effect are researched. It is shown that the dynamic efficiency in a holographic formation of nonstationary images can substationally exceed the analogous quantity in the case of bulk excitation of the resonant medium.

WY23 • The model of ionization of condensed medium in the field of intensive femtosecond pulses, A.A.Korolev, S.A.Stumpf, *SPbSIFMO (TU), Russia.* We introduce a model of interaction of laser radiation and dielectric medium, which correctly describes third order nonlinear medium polarization in a wide spectral range. The model includes description of tunnel and multi-photon ionization effects appearing when radiation intensity significantly increases.

WY24 • Simulation of the photon measurement density function for a multi-layered highly scattering medium, I.V.Meglinski, *Cranfield Univ., UK,* S.J. Matcher, *Univ. of Exeter, UK.* We propose a simple scheme, which can, to a good approximation, include the effects of a photon being partially reflected and refracted, while the computational complexity of generating two, independent photon trajectories following each reflection/refraction event.

WY25 • Laser-induced orientation and population dynamics in the antiprotonic helium, M.V.Ryabinina, L.A.Melnikov, *Saratov State Univ., Russia.* Laser-induced transitions between large angular momentum energy levels in the antiprotonic helium under the action of short pulse are studied numerically aimed at the investigations of polarization effects and the shape of the transition line.

WY26 • The peculiarities of the sub-picosecond pulse interaction with bulk dielectric samples, T.V.Smirnova, O.M. Fedotova, O.K.Khasanov, *Inst. of Solid State & Semiconductor Physics NASB, Belarus,* B.Rethfeld, K.Sokolowski-Tinten, D.von der Linde, *Inst. for Laser and Plasma Physics, Essen Univ., Germany.* The non-resonant interaction of high-power femtosecond laser pulses with a Kerr dielectric medium is investigated. The necessity of solving the self-consistend problem for the evolution of both the pulse field and the medium is shown.

WY27 • Optical transients in dense resonant media, A.A.Afanas'ev, R.A.Vlasov, *Inst. of Physics, NASB, Belarus,* O.K.Khasanov, T.V.Smirnova, *Inst. of Physics of Solids and Semiconductors, NASB, Belarus,* D.V.Gorbach, *Belorussian State Univ., Belarus.* The dynamics of such spontaneous processes as photon echo formation and free polarization decay in dense resonant medium under near dipole-dipole interaction conditions is studied theoretically. Excitation of responses by short and long pulses taking into account cooperative up-conversion is considered.

WY28 • Laser frequency up-conversion induced by collision and polarization effects, R.V.Markov, A.I.Plekhanov, A.M. Shalagin, *Inst. of Automation and Electrometry, SB RAS, Russia.* This work presents experimental results for laser frequency up-conversion induced by collision and polarization effects. As an active medium, sodium vapor in mixture with helium as a buffer gas is used.

WY29 • The storage effect in line burning at the infrared reflection spectra of natural silicates induced by pulsed CO_2 laser radiation, A.F.Mukhamedgalieva, *Moscow State Mining Univ., Russia,* A.M.Bondar', *Inst. of Metallurgy and Materials Science, RAS, Russia.* It has been established that by laser action of pulsed CO_2 laser radiation (pulse time of 200 ns, pulse energy of 2 J) on nepheline $KNa_3[AlSiO_4]_4$ and rodonite $CaMn_4[Si_5O_{15}]$ a stable burning of wide line with the line width of 50 cm^{-1} and narrow line with the line width of 5 cm^{-1} in infrared reflection spectra just at the frequency of laser action is appeared. It has been found, that the line burning degree depends on a number of laser pulses, which fall at the samples.

WY30 • On influence of local inhomogeneity of refractive index on laser damage, V.E.Gruzdev, M.N.Libenson, *State Research Centre "S.I.Vavilov State Optical Inst.", Russia.* There is considered influence of local variations of refractive index and nonlinear coefficient of refraction on threshold and dynamics of initial stage of laser-induced damage in transparent dielectrics. Dependence of damage threshold on parameters of the inhomogeneity and radiation is analyzed.

WY31 • Excitation in the rubber of the solitonic-type wave of change of reflection and conduction, E.M.Kudriavtsev, S.D.Zotov, *Lebedev Physical Inst. of RAS, Russia.* 3-dimensional solitonic-type wave structure was experimentally registered now in rubber, which does not have dislocations. It requires more universal physical mechanism development instead of slow wave model of dislocation annihilation suggested earlier by V.I.Emel'yanov.

WY32 • Laser induced resonant multi-photon and collisional ionizations of Rb atoms, S.A.Bakhramov, A.M.Kokhkharov, O.R.Parpiev, E.V.Vaganov, *NPO "Academpribor" AS RU, Uzbekistan.* Two photon ionization, collisional associative ionization and laser induced Penning ionization processes of Rb(5P) atoms are experimentally investigated at intensities $1–10^{-2}$ (~2,5 MW/cm^2 and densities $10^{10}–10^{14}$ atoms/cm^3. The dynamics of laser ion production was studied.

WY33 • The violation of parity selection rule in atomic transitions from resonantly mixed states, V.V.Suran, I.I.Bondar, *Uzhgorod National Univ., Ukraine.* The experimental studies of resonance transitions from resonantly mixed states of Ba atoms were performed. The large probability of multiphoton transitions with violation of parity selection rule for dipole approach was discovered.

WY34 • Experimantal investigations of nonresonant mixing of atomic states by strong laser radiation, I.I.Bondar, V.V. Suran, *Uzhgorod National Univ., Ukraine.* The results of experimental investigation of perturbation of atoms under circumstances when the value of ac-Stark shift of levels is comparable with difference between energies of these levels are presented. The perturbation of $6s5d^3D_1$ and $6s5d^3D_2$ states of barium atom by radiation of laser on colour centres (ω~8700 cm^{-1}) was investigated.

WY35 • Stimulated IR emission by optical pumping of Cs vapour, N.V.Znamenskii, E.A.Manykin, E.A.Petrenko, M.G.Sitnikov, *RRC "Kurchatov Inst.", Russia,* G.G.Grigorian, *Inst. for Phisical Research, Armenia.* It has been first established that by optical pumping of cesium vapour by pulse dye laser, tunable within the range 17020 cm^{-1}–19200 cm^{-1} and 20150 cm^{-1}–21390 cm^{-1}, lead to the powerful stimulated IR radiation on several atomic transitions. The mechanism of this phenomenon has been suggested.

WY36 • Propagation of a coherent electromagnetic wave in a medium with cylindrical pores, N.L.Cherkas, *Belarussian State Univ. of Inform. and Radioelectr., Belarus.* The optical characteristics of a medium with cylindrical pores is investigated theoretically by using the effective refractive index which is found from the dispersion equation for an infinite medium. The spectral characteristics of porous medium depend on the regularity in pores placement.

WY37 • Dynamics superradiance and coherent amplification ultrashort light pulses in extended systems under incoherent pump, R.F.Malikov, R.K.Hismatullin, M.M.Zinatullin, *Bashkir State Pedagogical Univ., Russia.* The dynamics of the superradiance and coherent the amplification under incoherent pump have been investigated. The new regime of the superradiance has been obtained. The self-oscillation superradiance regime has been the sphere of the particular interest. The study of superradiance regimes as a function of homogeneously and the inhomogeneously luminescence line broadening has been made.

WY38 • Laser induced mechanoluminescence of thin metallic film surface, A.F.Banishev, V.Ya.Panchenko, A.V.Shishkov, *Inst. of Laser and Information Technologies, RAS, Russia.* This paper presents the investigations of spectral composition and kinetics of mechanoluminescence (ML) of metallic films (Al, Ti, Mo, Cu), excited by pulsed laser action. Relying on experimental data, an interpretation of

mechanisms of ML signal emergence is advanced.

WY39 • Generation of cascade Stokes and anti-Stokes components by stimulated Raman scattering in gases, A.V. Andreev, A.A.Valeev, *Moscow State Univ., Russia*. The theory of cascade lines generation by means of stimulated Raman scattering in molecular and atomic gases is developed. The specific features of generated spectra in stationary and nonstationary cases are analyzed.

WY40 • The information approach to light-induced drift, O.A.Chichigina, *Moscow State Univ., Russia*. A new method is proposed for describing selective excitation as the addition of information to a thermodynamic system of atoms, decreasing the entropy of the system as a result. This information approach is used to calculate the light-induced drift velocity. The computational results are in good agreement with experimental data.

WY41 • Hartry-Fock semicondctor Bloch equations and charge density correlations, A.Klyukanov, *State Univ. of Moldova, Moldova,* N.Loiko, *Stepanov Inst. of Phys., Belarus*. A theory of multiplasmon optical transitions is developed for highly exited semiconductors using the fluctuation-dissipation theorem. Interavtions with mixed plasmon-phonons modes and excitonic effects are taken into account. Spontaneous radiation produced by interband multiplasmon recombination of electron-hole pairs is calculated.

WY42 • Statistical properties of quasienergy spectrum for a system of coupled quantum states in a quasimonochromatic field, V.S.Starovoitov, V.V. Churakov, *Stepanov Inst. of Phys., Belarus*. The shape for the Fourier transform C_τ of correlation function is investigated for a generic system of coupled quantum states in the presence of a quasimonochromatic field. An association between the state-state interaction and the dependence of the halfwidth for C_τ on the field amplitude is studied with using a Random Matrix Theory approach.

WY43 • Coherent states for the self-consistent problem on Dirac particle in a strong magnetic field, H.Grushevskaya, G.Krylov, *Belarusian State Univ., Belarus*. We demonstrate that quasi-steady states for highly excited atom in the vicinity of ionization threshold in a strong self-consistent oscillating magnetic field can be represented in the form of an expansion on coherent states of Dirac electron moving in self-consistent atomic potential. The asymptotic solutions have been construsted based on jet technique.

WY44 • Slow laser-induced deformation-thermal and defect-deformational solitons in thin solid films, V.I. Emel'yanov, A.V.Rogacheva, *Moscow State Univ., Russia*. The theory of new type of slow (velocity of order of several cm/sec, or less) deformation-thermal and defect-deformational solitons, excited in thin absorbing solid films by laser radiation, is developed. The experimental results on nondiffusional heat and matter transfer in laser-irradiated films are interpreted on its base.

WY45 • The effect of ion formation and emission from liquid water under IR laser vibrational excitation of H_2O, A.A.Chistyakov, D.V.Klotchkov, G.E.Kotkovskii, A.S.Nalobin, E.S.Tananina, *Moscow Engineering Phys. Inst. (Technical Univ.), Russia*. Ion Mobility Spectra of ions forming under resonant OH-stretch vibrational excitation of water were detected. The dependence of spectra on the laser radiation wavelength was found. An opportunity of use of water as matrix for large molecules investigations was demonstrated.

WY46 • Non-linear susceptibilities of $A_{III}B_V$ semiconductors in far infrared and microwave range, E.V.Moisseenko, A.V. Shepelev, *Moscow State Textile Univ., Russia*. Approach to calculation of nonlinear susceptibilities of semiconductors in far infrared and microwave range, based on account of interaction of free carriers with intrinsic excitations of semiconductors and ionized impurities is developed. Numerical dependencies of χ_3 on frequency, temperature and concentration of impurities for a set of semiconductors are obtained.

WY47 • Optical superradiance and reversed free-induction decay in Van Vleck paramagnet, V.V.Samartsev, A.A. Kalachev, V.A.Zuikov, *Kazan Phys. and Tech. Inst., Russia*. Phenomena of Optical superradiance and reversed free-induction decay are investigated in $LaF_3:Pr^{3+}$ crystal. The possibility of creation of optical memory devices based on these phenomena is considered. The multipulse regime of optical superradiance excitation is analyzed.

NOTES

Conference Hall

8:30–10:30
ThA • Plenary Lectures II
S.N.Bagayev, *Inst. of Laser Physics, Russia, Presider*

8:30–9:30
ThA1 (Plenary Lecture) • Optical frequency standards—the clocks of the future, L.Hollberg, C.W.Oates, E.A.Curtis, S.A.Diddams, Th.Udem, J.C.Bergquist, R.E.Drullinger, W.M.Itano, D.J.Wineland, *Nat. Inst. of Standards and Technology, USA*. Two optical frequency standards, one based on laser-cooled Ca, and the other on a single laser-cooled trapped Hg^+ ion, are being developed. Exceptional short-term stability is demonstrated and performance characteristic and absolute frequency measurements will be discussed.

9:30–10:30
ThA2 (Plenary Lecture) • Optical tomography of biotissues: old problems and new developments, A.Sergeev, *Inst. of Appl. Phys., Russia*. Development of lidar sensing techniques in turbid media is surveyed from underwater laser vision towards optical tomography of biotissues. It is demonstrated how, based on understanding general principles of light propagation in scattering media, new bioimaging modalities have been implemented and are making their way to clinical applications.

10:30–12:30 EXHIBIT ONLY TIME (coffee is served at the exhibit)

12:30–14:00 LUNCH (on your own)

Hall 1

14:00–16:00
ThB • Physics of Nanostructures V
S.V.Gaponenko, *Inst. of Mol. and Atomic Physics, NASB, Belarus, Presider*

14:00
ThB1 (Invited) • Nonlinear optical spectroscopy of confined excitons in semiconductor nanocrystals, T.Itoh, K.Edamatsu, *Osaka Univ., Japan.* Two-photon and two-step transient absorption methods were adopted for the investigation of confined-exciton excited states of CuCl nanocrystals. Weak and strong confinement regimes were found to coexist among confined excitons with different internal motions.

14:30
ThB2 (Invited) • Second-harmonic near-field microscopy of nanostructures, S.I.Bozhevolnyi, *Institute of Physics, Aalborg Univ., Denmark.* Scanning near-field optical microscopy utilizing detection of second-harmonic radiation in the sample is considered. Experiments on wavelength-resolved microscopy of ferroelectric domain walls, Langmuir–Blodgett films, and semiconductor quantum dots are reviewed along with relevant theoretical studies.

Hall 2

14:00–16:00
ThC • Nonlinear Optical Phenomena I
V.A.Makarov, *Moscow State Univ., Russia, Presider*

14:00
ThC1 (Keynote) • Nonlinear propagation of femtosecond pulses in the atmosphere, A.Mysyrowicz, B.Prade, *ENSTA–Ecole Polytechnique, France.* We review experiments concerning the propagation of intense UV and IR femtosecond pulses in air. Long-range filamentation is observed and characterized. Results are compared to numerical simulations.

Hall 3

14:00–16:00
ThD • Lasers in Chemistry, Biophysics, and Biomedicine V
A.N.Rubinov, *Stepanov Inst. of Physics, NASB, Belarus, Presider*

14:00
ThD1 (Invited) • Femtochemistry with 20 fs pulses: letting vibronic wavepackets teach us about the reaction mechanism, E.Riedle, *Ludwig-Maximilians-Univ., Germany.* Changes in the molecular electronic structure during chemical reactions are accompanied by nuclear rearrangement. For ultrafast reactions ringing in modes that project strongly on the changed geometry is observed as wavepacket motion and allows the identification of the reaction mechanism.

14:30
ThD2 (Invited) • Coherent control of elementary chemical reactions by means of femtosecond light pulses, O.M.Sarkisov, *N.N.Semenov Inst. of Chem. Phys., Russia.* New approaches for the chemical reaction control by specially prepared femtosecond light pulses are considered for different products formation in multi photon transformations of ammonia, [2,2′–bipyridyl]–3,3′–diol.

Hall 4

14:00–16:00
ThE • Quantum and Atomic Optics I
D.Meschede, *Univ. of Bonn, Germany, Presider*

14:00
ThE1 (Keynote) • Recent advances in dielectric cavity QED, D.Bloch, M.Ducloy, *Univ. Paris Nord, France.* We discuss the influence of dielectric dispersion and dielectric microcavity resonances, leading to giant atom-dielectric attraction/repulsion, as well as atom symmetry break induced by the anisotropy of the surface near-field. Experimental approaches to the response of dielectric-confined atoms include selective reflection spectroscopy, absorption spectroscopy of sub-micrometer gas cells, or atom beam transmission through nanostructures.

Hall 5

14:00–16:00
ThF • Fundamental Aspects of Laser–Matter Interaction III
R.B.Miles, *Princeton Univ., USA, Presider*

14:00
ThF1 (Invited) • Laser-induced nonsequential multiple ionization of atoms: a premium for cooperation, W.Becker, *Max-Born-Inst., Germany.* Recent developments in nonsequential multiple ionization of rare-gas atoms are reviewed. A model is presented for the calculation of the *S* matrix on the basis of a given scenario such as rescattering. Implications for the electron–electron correlation are discussed.

14:30
ThF2 (Invited) • About the role of the excited atomic states of a gas in the nonlinearity of the photoionized plasmas, V.P.Silin, *Lebedev Phys. Inst., Russia.* It is predicted the strong enhancement of the inverse Bremsstrahlung absorption of the pump field radiation and the extremely strong enhancement of the third harmonic radiation with the increase of the principal quantum number of the excited states of atomic electrons when the plasmas is photoionized in the regime of the barrier suppression ionization.

Hall 1	Hall 2	Hall 3	Hall 4	Hall 5
ThB • Physics of Nanostructures V (Continued)	**ThC • Nonlinear Optical Phenomena I (Continued)**	**ThD • Lasers in Chemistry, Biophysics, and Biomedicine V (Continued)**	**ThE • Quantum and Atomic Optics I (Continued)**	**ThF • Fundamental Aspects of Laser–Matter Interaction III (Continued)**
	14:45 ***ThC2 (Invited) • Wideband conical emission in the propagation of powerful femtosecond laser pulses in air,*** I.S.Golubtsov, V.P.Kandidov, O.G.Kosareva, *Moscow State Univ., Russia.* We have numerically studied generation of wideband conical radiation in the propagation of high intense femtosecond laser pulse in air. The conical emission is shown to be the result of self-phase modulation of high intense laser radiation in space and time.		*14:45* ***ThE2 (Invited) • Atom optics and high-resolution spectroscopy of cooled Mg beams,*** S.N.Bagayev, V.I.Baraulya, A.E. Bonert, A.N.Goncharov, M.R.Seydaliev, *Inst. of Laser Phys., Russia.* An atom interferometer based on laser-cooled Mg beam offers possibility for carrying out fundamental research in the field of atomic physics. Many practical applications of Mg interferometer in metrology are expected. This paper presents experimental results on laser cooling and deflection of Mg beam as well as the results on high-resolution spectroscopy of Mg atoms at 457 and 285 nm.	
15:00 ***ThB3 (Invited) • Nonlinear optics and nonlinear magneto-optics in magnetic nanoparticles,*** O.A.Aktsipetrov, *Moscow State Univ., Russia.* Results of recent experimental studies of giant NOMOKE in Co-Cu and Co-Ag granular films are surveyed. Amazing correlation between nonlinear optical properties and giant magneto-resistance is observed. Results of giant NOMOKE observation in self-assembling films of YIG nanoparticles are presented.		*15:00* ***ThD3 (Invited) • Selective IR multiple-photon + UV multiphoton fragmentation and ionization of polyatomic molecules,*** V.N.Lokhman, A.A.Makarov, D.D.Ogurok, E.A.Ryabov, *Inst. of Spectroscopy, Russia.* The photochemical processes induced by combined IR+UV laser irradiation of polyatomic molecules are studied. Such an irradiation results in IR multiple-photon dissociation of the parent molecules and subsequent fragmentation and ionization of radicals due to UV multiphoton excitation. The results of IR MPD + UV MPI for CF_2HCl and SF_6 molecules are presented and the possible applications of this approach are discussed.		*15:00* ***ThF3 • Laser-produced metastable ultracold plasma,*** S.I.Yakovlenko, A.N.Tkachev, *General Phys. Inst., Russia.*
	15:15 ***ThC3 (Invited) • Supercontinuum and harmonic generation in optical fiber pumped by high power CW fiber laser,*** Ken-ichi Ueda, M. Prabhu, J. Xu, *Univ. of Electro-Communications, Japan.* Supercontinuum of 100 to 150 nm bandwidth was generated in the fiber Raman oscillator containing the phosphosilicate glass fiber and fiber Bragg grating in a manner of cw single mode pumping by a Yb-doped fiber laser. Fiber-laser-pumped fiber laser with Tm-Ho-doping generated 2-micron output and the second harmonics of pumping beam.		*15:15* ***ThE3 (Invited) • Coherent storage of photon states and quantum information processing in atomic ensembles,*** M.D.Lukin, *Harvard-Smithsonian Center for Astrophysics, USA.* We describe a technique for coherent transfer of quantum information between light and matter. It is based on trapping quantum states of photons in coherently prepared media, in which the group velocity is adiabatically reduced to zero.	*15:15* ***ThF4 • Dynamical Lamb effect versus dynamical Casimir effect,*** Yu.E.Lozovik, *Inst. of Spectroscopy, Russia.* N.B.Narozhny, A.M.Fedotov, *Moscow Engin. Phys. Inst., Russia.*

Hall 1

ThB • Physics of Nanostructures V (Continued)

15:30
ThB4 (Invited) • Nonlinear magneto-optic quantum micro-cavities, R.Frey, *Inst. d'Optique & CNRS, France,* R.André, *Univ. J. Fourier Grenoble I & CNRS, France,* C.Flytzanis, *Ecole Normale Supérieure & CNRS, France.* We present theoretical and experimental studies of the nonlinear behavior in a magneto-optic quantum micro-cavity in the strong coupling regime by using nonlinear Faraday rotation and reflectivity techniques. The nonlinear behavior was traced to photo-induced modifications of the exciton–polariton features.

Hall 2

ThC • Nonlinear Optical Phenomena I (Continued)

15:45
ThC4 • Filamentation of powerful femtosecond laser pulses in the atmospheric air, K.Yu.Andrianov, V.P.Kandidov, O.G.Kosareva, M.P.Tamarov, *Moscow State Univ., Russia,* Chin S.L., A.Talebpour, *Laval Univ., Canada.* We did an experiment and developed numerical model of the filament wandering in the propagation of the powerful femtosecond laser pulses in the turbulent air. Statistical processing of experimental and numerical data showed that displacement of the filament center are statistically isotropic and obey the Rayleigh distribution law.

Hall 3

ThD • Lasers in Chemistry, Biophysics, and Biomedicine V (Continued)

15:30
ThD4 • Chemical reactions of HCl^+ ions —from understanding to control, M.Michel, M.V.Korolkov, M.Malow, K.Brembs, K.-M.Weitzel, *Freie Univ. Berlin, Germany.* We have investigated the rotational selectivity of the 2+1 REMPI formation of HCl^+ ions. The reaction of these state-selected ions with CO exclusively leads to proton transfer with a large rate constant.

15:45
ThD5 • Isotopically selective IR multiphoton dissociation of molecules in a pulsed gas dynamic flow interacting with solid surface, G.N.Makarov, S.A. Mochalov, *Inst. of Spectroscopy, Russia,* A.N.Petin, *Troitsk Inst. of Innov. and Thermonucl. Res., Russia.* Isotropically selective IR multiphoton dissociation of molecules (SF_6 and CF_3I) in the non-equilibrium conditions of a pressure shock formed when a pulsed gas dynamically cooled supersonic molecular flow interacts with a solid surface was investigated for the first time.

Hall 4

ThE • Quantum and Atomic Optics I (Continued)

15:45
ThE4 • Exploring the role of the relative phase in atom-field interaction, L.Sanchez-Soto, J.Delgado, E.S.Yustas, *Univ. Complutense, Spain,* A.B.Klimov, *Univ. de Guadalajara, Mexico.* We explore the role played by the quantum relative phase in atom-field interactions. We introduce an appropriate polar decomposition of the amplitudes that leads to a truly Hermitian relative-phase operator. We find the relative-phase distribution and its time evolution.

Hall 5

ThF • Fundamental Aspects of Laser–Matter Interaction III (Continued)

15:30
ThF5 (Invited) • Spherically symmetric structural resonances of laser radiation in nonlinear media, V.V.Kabanov, *Stepanov Inst. of Phys., Belarus.* The problem of the nonlinear interaction of the laser radiation with spherical microparticles is reviewed. The possibility of the realization of a spherically symmetric vortex of the electromagnetic field in a homogeneous isotropic medium are analyzed.

16:00–16:30 COFFEE BREAK

Hall 1

16:30–17:30
ThG • Physics of Nanostructures VI
O.A.Aktsipetrov, *Moscow State Univ., Russia, Presider*

16:30
ThG1 (Invited) • Semiconductor lasers on the base of selforganized quantum dot structures, P.S.Kop'yev, *Ioffe Phys. Tech. Inst., Russia.*

17:00
ThG2 (Invited) • Photons confined in 3D-microcavities doped with quantum dots, U.Woggon, M.V.Artemyev, B.Mueller, W.Langbein, *Univ. Dortmund, Germany.* Core-shell microspheres doped with quantum dots have been studied. The single dot-single mode coupling is found, a concept for a quantum-dot microlaser is demonstrated and the enhancement in the spontaneous emission rate is observed.

Hall 2

16:30–18:45
ThH • Nonlinear Optical Phenomena II
A.P.Sukhorukov, *Moscow State Univ., Russia, Presider*

16:30
ThH1 (Invited) • Problems of nonlinear optics of extremely short light pulses, S.A.Kozlov, *St. Petersburg State Inst. of Fine Mech. and Optics, Russia.* New field- and spectrum- based approaches are grounded for the self-action analysis of pulses containing only several light field oscillations in a transparent optical medium. Spectrum supercontinuum generation, ultrashort soliton and "light bubble" formation and other phenomena are studied in detail with the help of the approaches.

17:00
ThH2 (Invited) • Nonparaxial spatial optical solitons in transparent media, N.N.Rosanov, *Res. Inst. for Laser Phys., Russia,* Theory of transversely two-dimensional conservative optical solitons with transverse size comparable with the light wavelength in transparent isotropic and anisotropic media with the Kerr, saturable, and quadratic nonlinearities is given. Soliton polarization state obtained is elliptical and changing over the soliton transverse section.

Hall 3

16:30–18:30
ThI • Lasers in Chemistry, Biophysics, and Biomedicine VI
E.A.Ryabov, *Inst. of Spectroscopy, RAS, Russia, Presider*

16:30
ThI1 (Invited) • Laser distillation of a racemic isotropic mixture of chiral molecules, B.A.Grishanin, V.N.Zadkov, S.S.Bychkov, *Moscow State Univ., Russia.* Employing coherent control theory for manipulating molecular chirality in a racemic isotropic mixture is discussed. Laser distillation scenario for distillation of a racemic isotropic vapor of hydrogen peroxide molecules by means of NOA-CARS is proposed.

17:00
ThI2 • Surface second harmonic generation from chiral liquids enhanced by surface electromagnetic wave excitation, M.M.Nazarov, A.P.Shkurinov, *Moscow State Univ., Russia.* Surface Second Harmonic Generation enhanced by SEW excitation is used to study the chiral surfaces. The particular interest is paid to the practical applications of nonlinear optical methods for studies of molecules of biological origin.

Hall 4

16:30–18:45
ThJ • Quantum and Atomic Optics II
M.Ducloy, *Univ. Paris Nord, France, Presider*

16:30
ThJ1 (Invited) • Controlling single neutral atoms, D.Meschede, S.Kuhr, W.Alt, D.Schrader, M.Müller, V.Gomer, *Univ. Bonn, Germany.* We have realized a dipole trap, which allows us to store an exactly known number of Cesium atoms up to a minute. Atoms can be transported over distances of order several millimeters with submicrometer precision.

17:00
ThJ2 (Invited) • Laser cooling and trapping of radioactive atoms, L. Moi, V.Biancalana, A. Burchianti, C.Marinelli, E. Mariotti, G. Stancari, S. Veronesi, INFM, *Unità di Siena, Italy,* S.N.Atutov, R.Calabrese, V.Guidi, B.Mai, L. Tomassetti, *INFN, Sezione di Ferrara, Italy,* L. Corradi, A. Dainelli, *Lab. Nazionali di Legnaro, Italy.* Laser cooling and trapping of radioactive atoms represent the new frontier in atomic physics. We are setting up at the Legnaro National Laboratories a 210Fr magneto-optical trap. The improvements of the trap collection effici

Hall 5

16:30–18:45
ThK • Fundamental Aspects of Laser–Matter Interaction IV
A.V.Andreev, *Moscow State Univ., Russia, Presider*

16:30
ThK1 (Invited) • Nonlinear optical spectroscopy as a novel tool for studying magnetic phenomena in solids, R.V.Pisarev, *Ioffe Phys. Tech. Inst., Russia.* The application of the SHG spectroscopy for studying d–d and f–f electronic transitions, magnetic and magnetooptical properties of magnetically ordered materials are discussed. The experimental results are presented and analyzed for several groups of magnetics, like hexagonal rare-earth manganites, magnetic garnet films, and some others.

17:00
ThK2 (Invited) • Light beam scattering under transmission trough dielectric plate with large-scale rough surface, V.N.Seminogov, V.A.Semchishen, V.Ya. Panchenko, *Inst. on Laser and Inform. Technologies, Russia.* Analytical vector theory of refracted light beam scattering for an arbitrary intensity profile and polarization of incident beam is developed using Kirchhoff's method. Gaussian and nongaussian homogenization of an arbitrary intensity distribution of incident beam under scattering is investigated theoretically and experimentally.

Hall 1	Hall 2	Hall 3	Hall 4	Hall 5
ThG • Physics of Nanostructures VI (Continued)	**ThH • Nonlinear Optical Phenomena II (Continued)**	**ThI • Lasers in Chemistry, Biophysics, and Biomedicine VI (Continued)**	**ThJ • Quantum and Atomic Optics II (Continued)**	**ThK • Fundamental Aspects of Laser–Matter Interaction IV (Continued)**
		17:15 ***ThI3 • Interplay between micro- and macroscopic friction during excited state isomerization of 1,1'-diethyl-2,2'-cyanine iodide in n-alcohol solutions,*** A.Yartsev, A.Tarnovsky, V.Sundström, *Lund Univ., Sweden.* We have observed a clear difference in viscosity dependence of lifetime of reaction transients on their location on excited state potential during photo-induced isomerization by resolving the entire downhill motion of excited state population.	ency will be discussed and the preliminary results obtained with sodium and rubidium presented.	
	17:30 ***ThH3 • Short pulse generation by one-step SBS,*** R.Buzelis, A.Dement'ev, E. Kosenko, E.Murauskas, *Inst. of Phys., Lithuania.* A detailed numerical and experimental analysis of the spatio-temporal evolution of Stokes pulses during the transient SBS process is presented. It is shown that compressed Stokes pulses usually have a complex spatial-temporal structure. Short pulses (~80 ps) were obtained by extracting the central part of the Stokes beam generated in C_nF_{2n+2}.	*17:30* ***ThI4 • Collisionally assisted highly selective laser isotope separation,*** O.V.Boyarkin, T.R.Rizzo, *LCPM, DC, EPFL, Switzerland.* A new two-color overtone preexcitation-infrared multiphoton dissociation approach has been applied to highly selective molecular laser isotope separation of carbon. The isotopic selectivity is greatly enhanced by collisions resulting in single stage enrichment of dissociation products to 99% of ^{13}C.	*17:30* ***ThJ3 (Invited) • Evaporative cooling in optical traps,*** R.Grimm, M.Hammes, D.Rychtarik, T.Weber, J.Herbig, H.-C.Nägerl, *Innsbruck Univ., Austria,* M.Mudrich, S.Kraft, K.Singer, A.Mosk, M.Weidemüller, *Max-Planck-Inst. for Nuclear Phys., Germany.* Evaporative cooling in optical traps opens up new routes to attain a two-dimensional gas and to reach BEC of cesium. In a two-component atomic mixture a novel "sympathetic" evaporation effect is observed.	*17:30* ***ThK3 • Investigation of optical nonlinearities in n-GaAs based on multi-valley distributed hot electrons,*** J.Stiens, R.Vounckx, *Vrije Univ. Brussel, Belgium,* V.Kotov, G.Shkerdin, *Inst. of Radio-Engin. and Electr., Russia,* G.Borghs, *Inter-university Microelectr. Centre, Belgium.* The experimental results of the nonlinearity in highly doped n-GaAs induced by optically heating free electrons with a pulsed CO_2 laser are represented. Experimental data are analyzed by means of a rigorously developed multi-valley model.
	17:45 ***ThH4 (Invited) • The cnoidal wave concept in some problems of nonlinear optics,*** V.Aleshkevich, Ya.Kartashov, *Moscow State Univ., Russia,* V.Vysloukh, *CIICAp, U.A.E.M., Mexico.* Review and generalization of recent theoretical, numerical and some experimental results concerning the application of the cnoidal wave concept in such problems of nonlinear optics as self-action in a time and in a space domains, bandwidth limited amplification of pulse trains in Er doped fiber amplifiers and Raman frequency conversion are reported.	*17:45* ***ThI5 • Laser-induced photochemical gas-phase reactions of vibrationally excited triplet molecules,*** G.A.Zalesskaya, D.L.Yakovlev, E.G.Sambor, *Inst. of Mol. and Atomic Phys., Belarus.* Mechanisms and rates of laser-induced gas-phase reactions of vibrationally excited triplet ketones were studied after adding electron and hydrogen donors using time-resolved emission and absorption. The influence of various competing processes was analyzed.		*17:45* ***ThK4 • Propagation Hanle effect of quadrupole polaritons in Cu_2O,*** S.A.Moskalenko, *Inst. of Appl. Phys., Moldova,* M.A.Liberman, *Uppsala Univ., Sweden.* The propagation Hanle effect of quadrupole polaritons in Cu_2O crystal is characterized by quasiresonant dependence on magnetic field strength as well as by the new periodic dependence with periodicity inverse proportional to effective sample thickness.

Hall 1	Hall 2	Hall 3	Hall 4	Hall 5
	ThH • Nonlinear Optical Phenomena II (Continued)	**ThI • Lasers in Chemistry, Biophysics, and Biomedicine VI (Continued)**	**ThJ • Quantum and Atomic Optics II (Continued)**	**ThK • Fundamental Aspects of Laser–Matter Interaction IV (Continued)**
		18:00 ***ThI6 • Study of ultrafast chemical dynamics by intense laser field dissociative ionization,*** S.A.Trushin, W.Fuss, K.-L.Kompa, W.E.Schmid, *Max-Planck-Inst. für Quantenoptik, Germany.* Probing by dissociative ionization allows monitoring all pathways of chemical reactions with femtosecond time resolution. Examples will be shown from different classes of ultrafast photoinduced reactions in organic and inorganic chemistry.	*18:00* ***ThJ4 • Laser cooling and trapping of atoms in a field, formed by elliptically polarized light waves,*** O.N.Prudnikov, A.V.Taichenachev, A.M.Tumaikin, V.I.Yudin, *Novosibirsk State Univ., Russia.* The kinetics of atoms in a laser field of general 1D configuration is considered. We obtain analytical expression for the potential force, friction and diffusion coefficients. Several new kinetic effects, which appear only in a field formed by elliptically polarized light waves, are predicted.	*18:00* ***ThK5 • Microscopic description of laser induced phase transitions in carbon,*** M.E.Garcia, H.O.Jeschke, K.H.Bennemann, *Freien Univ. Berlin, Germany.* We present a theoretical study of ultrafast phase transitions induced by femtosecond laser pulses of arbitrary form and duration. We discuss different examples of laser induced nonequilibrium structural changes in carbon.
	18:15 ***ThH5 • Approaches to coherence destruction of short laser pulses,*** E.V. Ivakin, A.I.Kitsak, N.V.Karelin, A.M. Lazaruk, A.S.Rubanov, *Stepanov Inst. of Phys., Belarus.* A short review of theoretical and experimental investigations of methods for coherence transformation of short laser pulses is presented. The methods considered are of high importance for laser projective lithography.	*18:15* ***ThI7 • Solvate shell microstructure of dye molecules in water-organic binary solvents revealed by polarization picosecond laser spectroscopy,*** B.Bushuk, A.Rubinov, Yu.Kalvinkovskaya, S. Bushuk, *Stepanov Inst. of Phys., Belarus.* The microstructure of Rhodamine 6G solvate shell in binary water-organic solvent is investigated by means of steady state and picosecond spectroscopy. The participation of intermolecular solvent–solvent H-bond in solvate shell formation is established.	*18:15* ***ThJ5 (Invited) • Generalized coherent states and quantum information,*** S.Ya. Kilin, *Stepanov Inst. of Phys., Belarus.* Applications of a wide class of generalized coherent states to different problems of quantum communication and computation, including the coding of 2D images, entanglement restoration, and optical implementation of quantum processors are discussed.	*18:15* ***ThK6 • Echo-spectroscopy of two level systems of multi-well adiabatic potencial of Pr^{3+} activator centers in Y_2SiO_5 crystals,*** Yu.V.Malyukin, R.S.Borysov, P.N.Zhmurin, A.N.Lebedenko, B.V. Grinyov, *Inst. for Single Cryst., Ukraine,* G.G.Grigoryan, N.V.Znamensky, E.A.Manykin, Yu.V.Orlov, E.A.Petrenko, T.G. Yukina, *RRC "Kurchatov Institute", Russia.*
	18:30 ***ThH6 • Simulation of ultra-short soliton-like pulse generation in lossy nonlinear dispersive optical fibers using the beam propagation method,*** A.H. Tehranchi, N.Granpayeh, *K.N. Toosi Univ. of Technology, Iran.* Generation of an ultrashort pulse from a quasi-CW weak-modulated signal is simulated within lossy nonlinear dispersive optical fibers, using the beam propagation method. Compression ratios and optimum fiber lengths required obtaining shortest picosecond pulses are presented in normalized form.			*18:30* ***ThK7 • Microwave magnetic envelope solitons—parallels and contrasts to optical solitons,*** C.E.Patton, *Colorado State Univ. USA.* Microwave magnetic envelope solitons in magnetic films allow one to test the nonlinear effects, which govern optical solitons on a scale for which phase as well as amplitude can be measured directly. One can tune the dispersion and nonlinear parameters to produce bright and dark solitons, trains of solitons, and higher order solitons in a controlled and quantitative fashion. This paper will consider these features.

18:30–20:00 Poster Sessions (in the foyers of the Halls 1,2, and 3 at the 3rd floor)

ThM • Nonlinear Optical Phenomena

ThM1 • Third optical harmonic generation in media with positive dispersion near three photon resonance, I.A.Kulagin, T.Usmanov, *NPO «Akadempribor», Uzbekistan.* It is shown, that influence of self-action effects is capable to expand a spectral range of resonant optical harmonic generation and in three-photon resonant medium with positive dispersion under tight focusing the influence of ac Shtark shift results in fourth-order power dependence of third harmonic efficiency on fundamental intensity and medium density. The comparison with known experimental data is carried out.

ThM2 • On photovoltaic current and 2ω-generation phase synchronism shift at photorefraction in KD*P, B.V.Anikeev, S.A.Kutsenko, D.Yu.Bakharev, T.V.Samoylenko, *Volgograd State Univ., Russia.* The experiments on measuring of a pulse photovoltaic current accompanying the detected earlier at room temperature photorefractive effect in KD*P crystal have been carried out. The results have been compared to measurings of a synchronism angle shift at a second harmonic generation (λ=0.53 μm) in a photorefraction state of a crystal.

ThM3 • "Pure" backward SRS on the transition in vibrationally excited hydrogen molecules, G.M.Mikheev, T.N. Mogileva, *Inst. of Appl. Mechanics, Russia.* The results of an experimental investigation of the backward stimulated Raman scattering on the vibrational transitions $Q_{01}(1)$ and $Q_{12}(1)$ in hydrogen molecules are reported. The regime of 'pure' backward scattering on the transitions $Q_{12}(1)$ was observed experimentally.

ThM4 • Laser beam propagation through a condensation trail behind aircraft, A.N.Kucherov, *Zhukovsky Central Aerohydrodynamic Inst., Russia.* The aerooptical problem of laser beam propagation through a contrail is solved by using a rigorous numerical calculation of the nonlinear Schrödinger (or Fresnel) equation and an asymptotic description of a turbulent condensation trail behind a large civil aircraft (Prandtl equations), including particle sizes distribution of the polydispersive water aerosol.

ThM5 • Generation of fifth harmonic in xenon using Bessel-Gauss laser beams, V.E.Peet, R.V.Tsubin, *Univ. of Tartu, Estonia.* Generation of a tunable resonance-enhanced fifth harmonic in xenon under excitation by tightly focused Gaussian and Bessel-Gauss laser beams is reported. The tuning curves and the relative efficiency of garmonic generation in Gaussian and Bessel-Gauss laser beams are compared and discussed.

ThM6 • Dynamics of optical vortices nucleation and nonlinear optical catastrophe from a smooth beam in Kerr-like media, A.M.Deykoon, G.A.Swartzlander, *Worcester Polytech. Inst., USA,* M.S.Soskin, *Inst. of Phys., Ukraine.* Nucleation of the vortex quadruples and an optical casp catastrophe from a smooth initially elongated Gaussian beam was observed. Nonlinear diffraction produces the elliptical annulus and the complex astroid in the near- and far-field accordingly.

ThM7 • Nonlinear unidirectional coupler in the photorefractive medium with purely diffusion nonlinearity, V.Aleshkevich, Ya.Kartashov, *Moscow State Univ., Russia,* V.Vysloukh, *CIICAp, U.A.E.M., Mexico.* We consider the influence of the purely diffusion photorefractive nonlinearity on the switching characteristics of the nonlinear unidirectional coupler consisting of two Gaussian waveguides putted in close proximity. It is shown that the maximal part of mode energy that can be transmitted into second guide monotonically decreases with increase of input mode energy.

ThM8 • Self-compression of the cnoidal waves in optical fibers, V.Aleshkevich, Ya.Kartashov, *Moscow State Univ., Russia,* V.Vysloukh, CIICAp, U.A.E.M., Mexico. We consider self-compression of the cnoidal waves of cn- and dn-types in materials with focusing Kerr nonlinearity. Dependencies of the compression degree on the parameter describing localisation of the wave energy are presented and the main features of the wave propagation are analysed on the basis of finite number harmonic approximation.

ThM9 • Fractional frequency conversion in $\chi^{(2)}$ nonlinear periodic media, V.V.Konotop, *Univ. de Lisboa, Portugal,* V.Kuzmiak, *Inst. of Radio Engin. and Electronics, Czech Republic.* In one-dimensional periodic nonlinear $\chi^{(2)}$ media it is allowed simultaneous resonant generation of second and third harmonics. This in particular leads to fractional frequency conversion, to "nondirect" second harmonic generation, to propagation of localized pulses, etc.

ThM10 • Efficient nonlinear reflection of UV-laser radiation in freons CF_3Br, CF_2Cl and mixtures with different gases, A.P.Burtsev, V.V.Bertsev, V.N.Bocharov, *St-Petersburg State Univ., Russia.* Efficient (reflectivity up to 40 %) nonlinear reflection of Xe-Cl-laser radiation was observed in CF_3Br and CF_3Cl. Pronounced enhancement of the effect was established, when buffer gases were added, SF_6 and CF_4 are the most efficient.

ThM11 • Efficient parametric oscillation in the presence of magnetic field, P.Aghamkar, Shiwani, S.Nepal, Suta, *Guru Jambheshwar Univ. Hisar, India.* A remarkable reduction in the value of threshold intensity of infrared parametric oscillator is obtained via amplification of a polaron mode in n-InSb at 5 K in the presence of an applied magnetic field.

ThM12 • Experimental study of second-harmonic generation by a laser pulse with varying direction of polarization in a type-II synchronism doubling crystal, J.J.S.Bernal, A.V.Kir'yanov, V.P.Robledo, *Centro de Investigaciones en Optica A.C., Mexico.* Experimental study is performed of the type-II optical SHG by the laser pulse which direction of polarization experiences time variations. These variations are shown to result in considerable transformations of the harmonic pulse. Significant shortening of the harmonic pulse is observed comparing the case of a launched pump pulse with fixed azimuth of polarization.

ThM13 • Separate conversion of the polarization state of polarized light spectral components, V.V.Chirkov, N.D.Kundikova, L.F.Rogacheva, *Inst. of Electrophys. and South Urals State Univ., Russia.* It was demonstrated theoretically and experimentally that a complex retardation system of several birefringent plates can be used for any desired simultaneous transformation of the polarization state of laser harmonics.

ThM14 • Parametric wave coupling in the scheme of a double phase conjugation, M.V.Bolshakov, N.D.Kundikova, U.V.Miklyaev, M.V.Zubrik, *Inst. of Electrophys. and South Urals State Univ., Russia.* The possibility of suppression of conical diffraction and extracting of a mutual grating recorded by three waves by means of parametric interaction of three mutually non-coherent waves in the scheme of a double phase conjugation is demonstrated experimentally.

ThM15 • Low-threshold instability of speckles in nonlinear disordered media, S.E.Skipetrov, *Moscow State Univ., Russia.* Speckle pattern resulting from the multiple elastic scattering of a coherent wave in a nonlinear disordered medium becomes unstable if the nonlinearity exceeds the threshlod value, which scales as $1/V^{1/2}$ (V is the medium volume).

ThM16 • Supercontinuum generation by frequency tunable pump in dispersion shifted fibers, V.Archireev, A.Korolev, V.Soloviev, *Corning Ltd., Russia,* D.Nolan, *Corning Inc., USA.* We report on spectra of supercontinuum generation in optical fiber pumped by 30 ps pulses of parametric oscillator tunable in the vicinity of zero dispersion point both in normal and anomalous regions. Shape of output spectra strongly depends on detuning and by pumping in anomalous region it extends up to 2100 nm

ThM17 • Optical soliton in a dielectric medium due to rotational torque on the dipoles of the medium, V.Veerakumar, M.Daniel, *Bharathidasan Univ., India.* A novel type of optical soliton propagation is observed in a dielectric medium due to the nonlinearity affected by the rotational torque produced by the induced dipoles when they interact with the external electric field.

ThM18 • Propagation of laser beams in photonic crystals with cubic nonlinearity, S.N.Kurilkina, A.L.Zykov, *Gomel State Univ., Belarus.* It has been investigated the influence of cubic nonlinearity and group velocity dispersion on focusing phenomenon in photonic crystals. It has been shown the possibility of their use for creation of binary focusing- defocusing elements controlled by electric field.

ThM19 • The paraxial self-focusing of few-cycle light pulses in transparent media, M.A.Bakhtin, A.N.Berkovsky, S.A.Kozlov, Yu.A.Shpolyanskiy, St. Petersburg State Institute for Fine Mechanics and Optics (Technical University), Russia. A new wave equation for evolution of femtosecond light fields in isotropic transparent media is presented. It is demonstrated that a "light bubble" can evolve from few-cycle pulse propagating through fused silica bulk. Two-octave spectrum supercontinuum is theoretically observed.

ThM20 • Steady-state spatial screening photorefractive solitons with applied external alternative electric field, V.V.Anikeyev, N.D.Kundikova, A.A.Postnikov, *Inst. of Electrophys. and South Urals State Univ., Russia.* We report about investigation of spatial solitons in photorefractive materials. Theoretical results, which include spatial distribution of electric charge and light intensity, were obtained. We observed self-trapping of optical beams with external alternative electric field.

ThM21 • Ultrabroadening of spatial spectrum of a self-focusing light beam, A.E.Kurasov, O.B.Bogumirsky, S.A.Izyurov, S.A.Kozlov, *St-Petersburg State Inst. of Fine Mechanics and Optics, Russia.* Dynamics of spatial spectrum of a self-focusing monochromatic optical wave in a medium with cubic nonlinearity is considered in nonparaxial approximation. The formation of optical needle with cross section on the order of a wavelength is demonstrated. Backward self-reflection phenomenon is found to be the fundamental cause for the limitation on catastrophic self-focusing.

ThM22 • Self-phase modulation of short light pulses in a gas-filled hollow fiber: searching for an optimum, A.N.Naumov, O.S.Kolevatova, A.M.Zheltikov, *Moscow State Univ., Russia,* G.Cerullo, M.Nisoli, S.De Silvestri, *Istituto Nazionale di Fisica della Materia, Italy.* The ways to achieve the maximum efficiency of pulse compression through self-phase modulation in a gas-filled hollow fiber are considered. The influence of optical losses due to the leakage of radiation out of the fiber and excitation of higher order waveguide modes is studied.

ThM23 • Geometric limits to phase matching in self-diffraction experiments, J.V.Gomes, A.J.G.Pereira, M.Belsley, *Univ. do Minho, Portugal.* In a self-diffraction experiment geometrical considerations severely limit the attainable degree of phase matching. As the sample thickness increases the signal displays rapid oscillations with an overall envelope that described by a complex error function.

ThM24 • Photorefractive grating and four-wave mixing in doped cadmium telluride crystals, I.N.Agishev, A.L.Tolstik, *Belarusian State Univ., Belarus,* O.K.Khasanov, V.N.Yakimovich, *Inst. of Solid State and Semicond. Phys., Belarus.* The diffraction and dynamic characteristics of photorefractive gratings formed on four-wave mixing in single crystals of cadmium telluride doped by transition elements have been studied. It has been demonstrated that introduction of vanadium, titanium or ferrum makes it possible to enhance optical nonlinearity and to extend the spectral region up to 2.5 μm.

ThM25 • Numerical simulation of parametric gap soliton trapping in Bragg grating, E.G.Pavlova, A.P.Sukhorukov, I.G.Zakharova, *Moscow State Univ., Russia.* Dynamics of two-color optical gap soliton trapping in quadratically nonlinear Bragg grating was investigated. The equations for the envelopes of four counter-propagating waves were solved numerically. Soliton trapping, tunneling, and reflecting at the boundaries were studied.

ThM26 • Charaterization of thermo-optic nonlinearities in neutral density filters using the Z-scan technique, A.Karalevich, M.Belsley, *Univ. do Minho, Portugal.* Thermo-optic nonlinearities excited using continuous laser radiation in neutral density filters are characterized using the Z-scan technique. A simple quadratic model including the nonlocal effects of heat diffusion qualitatively fit the observations.

ThM27 • The use of nonuniform phase plates for compensation of thermally induced birefringence in Faraday isolator, E.Khazanov, A.Poteomkin, E.Katin, N.Andreev, O.Palashov, *Inst. of Appl. Phys., Russia,* D.H.Reitze, *Univ. of Florida, USA.* It is shown that a quartz crystal, which is placed inside a telescope, may compensate for thermally induced birefringence in Faraday isolators. Isolation ratio was increased in experiment by a factor of 8.

ThM28 • Nonlinear propagation of Gaussian beams in microemulsions, M.Belsley, A.Karalevich, *Univ. do Minho, Portugal.* Z-scan measurements of water-AOT-octane microemulsions as a function of reverse micellar size are presented. At high incident powers optically induced phase transitions and bistability are observed.

ThM29 • Self-action of light beam in a photorefractive crystal under an external AC electric field, S.M.Shandarov, M.N.Frolova, M.V.Borodin, *State Univ. of Control Syst. and Radioelectr., Russia,* N.I.Najestkina, *Univ. of Joensuu, Finland.* The propagation of light beam periodically modulated in time, through photorefractive crystal subjected to the square-wave electric field is investigated. The existence conditions for soliton regime and the self-bending effect are considered.

ThM30 • Transient quasi-phase matching SRS generation, N.S.Makarov, *State Inst. of Fine Mechanics and Optics, Russia,* V.G.Bespalov, *Vavilov State Optical Inst., Russia.* Increasing of anti-Stokes SRS generation efficiency in conditions of quasi-phase matching in media with variations of parameters of the third order nonlinearity was studying. The obtained results of numerical simulations show the ways of increasing of anti-Stokes conversion efficiency and are promising for development of new effective up-conversion nonlinear-optical devices.

ThM31 • Quadratic soliton trapping in lossy cavities, O.A.Egorov, A.P.Sukhorukov, I.G.Zakharova, *Moscow State Univ., Russia.* We have investigated the influence of mirror losses and resonance detuning on spatial soliton trapping in quadratic cavities. The bistability domain with small and big losses was determined. The comparison of mean-field limit and round-trip model was performed.

ThM32 • On nonlinear effect of self-induced variation of polarization of tightly focused laser beams, V.E.Gruzdev, M.N.Libenson, *Vavilov State Optical Inst., Russia.* There is considered laser-induced variation of light polarization in focal area of tightly focused laser beam propagating in isotropic dielectric. Conditions and experimental setups required for clear observation of the effect are discussed.

ThM33 • Sub-wavelength quadratic spatial solitons, A.V.Pimenov, A.P.Sukhorukov, *Moscow State Univ., Russia.* The theory of sub-wavelength quadratic solitons developed in the frame of Maxwell's equations for type I nonlinear interaction. The fundamental limitation of soliton width and asymptotic profiles obtained using numerical and analytical methods.

ThM34 • Sum-frequency generation in photonic bandgap structure under condition of noncollinear wave interaction, V.A.Bushuev, B.I.Mantsyzov, E.V.Petrov, *Moscow State Univ., Russia.* We show theoretically that de to the noncollinear geometry of wave interaction in multilayer structure it is possible to optimize the process of enhancement of sum-frequency generation realizing both exact quasi-phase-matching condition and non-phase matching enhancement simultaneously.

ThM35 • Selfaction of Bessel beam in benzene, R.Gadonas, V.Jarutis, V.Smilgevičius, A.Stabinis, V.Vaičaitis, *Vilnius Univ., Lithuania.* The experimental results of an investigation of the self-action of Bessel beam (λ=532 nm) propagating in benzene are presented. The typical modifications of the far-field intensity distribution of Bessel beam caused by its self-action are revealed. A good agreement with computer simulation results is obtained.

ThM36 • On the self-channelling of light beams in semiconductor compounds, U.V.Zubrytski, *Stepanov Inst. of Phys., Belarus.* The self-channelling of cylindrical light beams versus the excitation density, light frequency, and crystallographic orientation is numerically analysed in GaAs, ZnSe, CdS semiconductors. Data obtained are compared with experiments for different laser systems.

ThM37 • Stabilization of optical soliton train dynamics in cubic inertial media, E.V.Doktorov, P.V.Vlasov, *Stepanov Inst. of Phys., Belarus.* In the framework of a two-component inertial nonlinearity model, the propagation of an optical soliton train in cubic media is investigated. A stabilization condition providing the train integrity against the action of intrapulse Raman scattering is obtained analytically wich is collaborated by computer simulation.

ThM38 • Nonlinear absorption at 266 nm in BBO crystal and its influence on frequency conversion, N.Kondratyuk, A.Shagov, *SC "Solar LS", Belarus.* The ultraviolet nonlinear absorption at 266 nm in BBO crystal and its influence on frequency conversion are discussed. A new continiously tunable ultraviolet source with high peak power is presented and investigated in detail. Based on OPA BBO system pumped by fourth harmonic of a Nd:YAG laser, UV radiation in the range of 300...400 nm was efficiency generated. UV energies of up to 10 mJ at 327 nm were achieved from a 35 mJ of pump energy at 266 nm.

ThM39 • Second harmonic generation with elliptical Bessel beams, V.N.Belyi, N.A.Khilo, E.S.Petrova, A.G.Maschenko, V.E.Leparskii, *Stepanov Inst. of Phys., Belarus.* Second harmonic generation using a new class of fields—elliptical Bessel beams—was considered. The conversion efficiency and the output patterns of the field at the doubled frequency were investigated theoretically and experimentally in uniaxial crystals.

ThM40 • Orientation of azo-dye molecules and optical nonlinearity in azo-dye-doped polymer waveguides, A.V.Tomov, A.V.Khomchenko, E.P.Kalutskaya, *Inst. of Appl. Optics, Belarus.* On the basic of an analysis of optical characteristics of nonlinear polymer waveguides and their IR-spectra the preferred orientation of dipoles of dye molecules in the waveguides is determined.

ThM41 • Bessel light beam self-diffraction in heavily doped n-InP under conditions of high optical nonlinearity, A.A.Ryzhevich, *Stepanov Inst. of Phys., Belarus,* I.A.Utkin, *Div. for Optical Problems in Inform. Technologies, Belarus.* Far-field patterns of Bessel light beams self-diffraction in heavily doped n-InP depending on input beam parameters and the nature of nonlinearity have been investigated experimentally and theoretically. The ability of Bessel light beams to self-diffract is very suitable for studying of optical properties of the nonlinear medium.

ThM42 • Transverse effects in parametric interaction of super-Gaussian pump beam and generated Bessel beams, T.A.King, *Univ. of Manchester, UK,* W.Hogerworst, *Free University, The Netherlands,* V.N.Belyi, N.S.Kazak, N.A.Khilo, N.V.Kondratyuk, A.A.Shagov, *Stepanov Inst. of Phys., Belarus.* Transverse effects were investigated in parametric frequency conversion of a super-Gaussian pump beam into generated Bessel beams. The effect of energy redistribution from pump and Bessel idler beams to diffraction-limited narrow axial beam was theoretically predicted and experimentally observed.

ThM43 • Second harmonic generation by quadribeam, N.S.Kazak, A.N.Khilo, E.G.Katranji, A.A.Ryzhevich, *Stepanov Inst. of Phys., Belarus.* The quadribeam was produced experimentally as a result of interference of four light beams by means of a pyramid having four refractive faces. The longitudinal and transverse distributions of the second harmonic field of the quadribeam depending on the position of nonlinear KTP crystal relative to the refractive element are investigated theoretically and experimentally.

ThM44 • Raman amplification in barium nitrate studied with focused laser beams, A.I.Vodchits, V.P.Kozich, D.A.Ivanov, V.A.Orlovich, *Stepanov Inst. of Phys., Belarus.* The imaginary part of the third order Raman nonlinearity in barium nitrate crystals is studied using Z-scan technique with focused laser beams. Raman amplification coefficients are measured for the different pump regimes and focusing conditions of stimulated Raman scattering.

ThM45 • Thermal lensing in barium nitrate due to stimulated Raman scattering of nanosecond laser pulses, V.P.Kozich, A.I.Vodchits, P.A.Apanasevich, V.A.Orlovich, *Stepanov Inst. of Phys., Belarus.* Barium nitrate crystals are studied using one- and two-beam Z-scan by excitation with the second harmonic radiation of nanosecond Nd:YAG laser and probing with the cw He:Ne laser. For the first time a thermal lens due to the dissipation of energy of the SRS-excited Ag vibrational mode (1047.3 cm^{-1}) to the heat is observed and measured.

ThM46 • To the theory of light bullets, A.M.Goncharenko, I.L.Garanovich, *Div. for Optical Problems in Inform. Technologies, Belarus.* Gaussin's functions are used to investigate properties of light bullets in Kerr nonlinear media. It is shown that the light bullets oscillate in space and time. The type of the nonlinearity and the collapse problem is discussed.

ThM47 • Monte-Carlo simulation of THz-pulse and second-harmonic generation from semiconductor surface, V.L.Malevich, *Div. for Optical Problems in Inform. Technologies, Belarus.* THz-pulse and electric field induced second harmonic generation from a semiconductor surface depletion layer excited by an

ultrashort laser pulse are analyzed by using ensemble Monte-Carlo simulation method. The impact of the excitation level and photon energy on these effects is shown to be dramatic.

ThM48 • Experimental and theoretical investigation of energy characteristics of transients SRS in compressed hydrogen at 2.5 ps pumping, A.G.Shvedko, S.G.Kruglik, V.A.Orlovich, P.A.Apanasevich, *Stepanov Inst. of Phys., Belarus.* Experimental and theoratical investigations of energy characteristics of transient SRS in compressed hydrogen using frequency-doubled 2.5 ps Ti:Sapphire laser pulses have been carried out. SRS was characterized in terms of pulse energy in the range of gas pressure 10–60 atm to use it as a light source for different applications.

ThM49 • Raman conversion of sub-nanosecond laser pulses in a barium nitrate crystal, A.S.Grabtchikov, A.G. Shvedko, R.V.Chulkov, V.A.Lisinetskii, P.A.Apanasevich, V.A.Orlovich, *Stepanov Inst. of Phys., Belarus.* We report experimental results for Raman conversion of sub-nanosecond laser pulses in the short length resonator. Conversion efficiency, improvements of output beam quality and pulse compression as compared to the single pass scheme are discussed.

ThM50 • Group representative of linear and nonlinear wave processes in crystals, A.G.Khatkevich, L.A.Khatkevich, *Stepanov Inst. of Phys., Belarus.* A group representation of wave equations in crystal optics is developed. On this base a new solution and the simple expression for the propagation velocities and the polarization vectors of waves in crystals are obtained. Their generalization on nonlinear optics is considered.

ThM51 • Gaussian beam self-focusing in dynamic polymer medium with photoinduced diffusion, Yu.V.Gritsai, U.V.Mahilny, *Belarusian State Univ., Belarus.* Gaussian beams propagation in anthracene containing polymeric layers with photoinduced diffusion of neutral added molecules is investigated. An opportunity of beam self-focusing under the maximum intensity not exceeding 100 mW/cm^2 is established. An optimization of self-focusing condition is carried out and it is shown that two-fold reduction of waist radius is possible.

ThM52 • Four-wave mixing in V-type atoms in a nonresonant light field, L.Gaida, V.Kartazaev, V.Savchik, *Grodno State Univ., Belarus.* The angular and spectral nature of the FWM emission spectra of sodium atoms driven by the laser tuned near the dispersion-free point has been studied. The experiment shows strong angular dependence of FWM emission spectra.

ThN • Lasers in Chemistry, Biophysics, and Biomedicine

ThN1 • Revivals in electronic-vibrational dynamics of diatomic molecules, S.A. Moiseev, M.I.Noskov, *Zavoisky Kazan Phys. Tech. Inst., Russia,* R.M.Aminova, *Kazan State Univ., Russia.* Quantum dynamics of the revival effect in diatomic molecules of Na_2–type is investigated. The influence of temperature and the spectroscopic parameters of non-equidistant multilevel structure of vibrational sublevels of molecules' electronic terms on character of the revival picture have been studied.

ThN2 • Laser induced polarization rotation effect in solutions of the glycini, S.A.Bakhramov, A.M.Kokhkharov, O.R. Parpiev, E.V.Vaganov, *NPO "Academpribor", Uzbekistan.* We have observed a laser induced polarization rotation effect in non-chiral solutions of Glycini (different pH). It was shown that the nonlinear rotation is possible under elliptically polarized laser beam and can be used for investigation of structural and functional features of non-chiral biomolecules.

ThN3 • Some applications of the signal velocity for the tomography, in particular laser photoacoustic tomography, A.A.Aliverdiev, A.A.Amirova, *Inst. of Phys. of Daghestan Sci. Center, Russia,* M.G. Karimov, G.M.Halilulayev, *Dagestan State Univ., Russia.* Here we represent some our solutions for the application of a registered signal velocity for the time-resolved optic tomography, in particular optoacoustic (photoacoustic) tomography. Some results of numerical simulations are presented.

ThN4 • Concentrational quenching of photoinduced bacterial activity processes of the triplet excited states and mechanisms of deactivation, E.Ph. Stranadko, *State Res. Center for Laser Medicine, Russia,* A.E.Obukhov, *Russian Peoples' Friendship Univ., Russia.* A series of experimental studies on letal photosensitization of microorganisms most often met in suparative wounds (Staphylococcus aureus, Staphylococcus epidermidis, Proteus mirabilis, Esherichia coli, Pseudomonas aeruginosa). The reason lies in the fact that the processes of reabsorbtion of the excited energy are of two-photon nature; generally, the photoprocesses are multiphoton and are followed by recombination of the changed particales (electrons and molecular ions) in the active medium.

ThN5 • The luminescence and decomposition mechanism of triethylsilane molecules by pulsed CO_2 laser, G.P. Zhitneva, *Kaprov Inst. of Phys. Chem., Russia,* Yu.N.Zhitnev, *Moscow State Univ., Russia,* A.P.Monyakin, V.V.Dobryakov, *Russian People's Friendship Univ., Russia.* The IR-multiphoton excitation of triethylsilane molecules under collisionless conditions results in the C–Si and C–C bonds fission reactions. At the high laser fluences the dissociation of the triethylsilane is accompanied by the laser-induced fragmentation of the primary dissociation products and the luminescence production.

ThN6 • Dynamics of molecular exchange-resonance photoprocesses on the surface of chemically modified silica, V.V.Bryuhanov, *Kaliningrad State Tech. Univ., Russia.* The processes of triplet-triplet energy transfer and triplet-triplet annihilation of homo-and heterotype of erytrosin-antracen molecular system on the surface of chemically modified silica have been studied at various temperatures. It was shown that these processes are limited by the diffusion. The constant rates of exchange-resonance interaction have been measured: $K_{T\text{-}T} = 10^6$; $K^A_{TTA} \sim 10^8$; $K^{DA}_{TTA} \sim 3\times10^6$ mol^{-1}nm^{2}c^{-1}.

ThN7 • The selective destruction of viral particles capsides by powerful laser radiation, A.A.Rudenko, N.B.Matsko, D.I.Chekhov, A.G.Leonov, *Moscow Inst. of Phys. and Technology, Russia,* A.A. Manykin, *Inst. of Virology, Russia.* Powerful laser radiation was applied to destroy capsides of viral particles in order to study the internal DNA organization. The significant results were obtained for bacteriophage PhiKZ. The possible mechanisms of capside destruction were considered.

ThN8 • Microspectral investigation of hair of one girl over 6 years by laser emission analysis, T.N.Sokolova, *RPF "Pribor-T", Russia,* E.L.Surmenko, V.V. Tuchin, *Saratov State Univ., Russia.* Multiple chemical elements of clinical and nutritional interest were measured in the hair of a girl — cerebral paralysis patient. Sixteen samples of hair were cut and investigated at regular intervals to determine time and nutrition trends.

ThN9 • Photochemistry of pyrylium compound: excitation-induced rearrangement of a molecule-solvent complex, E.N.Kaliteevskaya, V.P.Krutyakova, T.K.Razumova, *Vavilov State Optical Inst., Russia,* A.D.Roshal, *Khar'kov Natl Univ., Ukraine.* The photochemical rearrangement of a solvated complex of pyrylium compounds is studied in solvents of various polarity and nucleophility. The photoexcitation results in intramolecular charge transfer and geometrical rearrangement of molecule and solvate. As a result, two types of transient complexes in excited state are formed.

ThN10 • Laser detoxycation of sharp poisonings with carbon monoxide, A.S.Provorov, V.V.Salmin, E.Y.Stavickay, A.B.Egorova, *Krasnoyarsk State Univ., Russia.* A series of model experiments with laser-induced ptotodissotiation of HbCO has been carried out. The preliminary results allow us to propose the application of laser-induced HbCO photodissotiation in the capacity of new physical method to treat the acute carbon monoxide poisoning.

ThN11 • UV-induced signal transduction in epidermal cells: from surface receptors to protein kinase C. **The mathematical model,** M.M.Stolnitz, A.Yu.Peshkova, *Saratov State Univ., Russia.* In the paper the mathematical model of UV-induced PKC activation is presented. Phosphorylation of membrane receptors, activation of phospholipases and phospholipids turnover, diacylglycerol, inositol trisphosphate and arachidonic acid production, calcium releasing are taken into account.

ThN12 • The propagation of short laser pulse in water, S.S.Narivonchik, *State Inst. of Fine Mech. and Optics, Russia,* V.G.Bespalov, *Vavilov State Optical Inst., Russia.* The propagation of short laser pulse in water media was studied. The dependencies of scattered signal parameters from the scattering particle density and cross section were obtained. These dependencies could be used for media analyzing and inhomogeneity detection.

ThN13 • Laser photomodification of nucleic acids by xantene dyes, S.N.Letuta, Yu.D.Lantukh, S.N.Pashkevitch, H.N.Nikiyan, *Orenburg State Univ., Russia.* Various ways of photomodification of nucleic acids by laser radiation of a visible range are considered in the work. The molecules of xhantene dyes participate in all cases of modification. Dye acts as mediator between laser radiation and macromolecule.

ThN14 • Neoplasm diagnostics based on fluorescence of polymethine dyes, E.S.Voropay, *Belarusian State Univ., Belarus,* M.P.Samtsov, *Res. Inst. for Appl. Phys. Problems, Belarus,* E.A.Zhavrid, V.N.Chalov, *Res. Inst. of Oncology and Medical Radiology, Belarus.* The depth to which the polymethine dye fluorescence may be recorded has been determined *in vitro* and *in vivo*. The investigations have indicated higher selectivity of the dye accumulation in tumor compared to the neighboring muscle tissue and uniformity of the dye distribution in the tumor.

ThN15 • Laser-thermal transformation in collageneous tissues, N.Yu.Ignat'eva, V.V.Lunin, A.F.Majorova, S.N.Mudretsova, T.E.Grohovska, *Moscow State Univ., Russia,* V.N.Bagratashvili, E.N.Sobol, A.P.Sviridov, *Inst. of Laser and Inform. Technology, Russia.* We determined change of supramolecular structure in cartilage and fascia. Tissue samples were examined using differential scanning calorimetry. Observing collagen denaturation was reduced after nonablative IR laser irradiation.

ThN16 • New approach for absorption spectra and dispersion of erythrocytes and polarization of medium, A.M.Radin, *St.-Petersburg Univ. for Low-Temp. Technologies, Russia.* The modes in three-dimensional ring optical resonators with absorptive or strengthening fields of media are constructed. The theory is Appl. for the computer prognosis of absorption spectra and dispersion of erythrocytes intracavity by a method. The new approach for an estimation of a polarization of media is offered.

ThN17 • Monte-Carlo simulation of multi-layered biological tissue non-invasive research, E.P.Savchenko, V.V. Tuchin, *Saratov State Univ., Russia.* In this paper, we described our results of Monte-Carlo simulations of light propagation in a multi-layered biological tissue, such as the human brain and the skin. We included in our program many opportunities for light propagation and light beam research at different aspects. Our program supports some types of optical schemes, different kinds of light beams, some variants of photons selection, dynamic models of light propagation and some others. This article contains main results of our Monte-Carlo simulations of different tissue, general principles of our algorithm and comparison with other NIRS research.

ThN18 • Are the subglobular oscillations of protein molecules in water overdamped? A.V.Netrebko, N.V.Netrebko, Yu.M.Romanovsky, A.Yu.Chikishev, *Moscow State Univ., Russia.* To interpret low-frequency Raman data, we consider subglobular oscillations of protein molecules in water. According to hydrodynamics, their Q-factor is close to unity. We use the method of molecular dynamics to demonstrate that Q~10 at the amplitudes smaller than 0.2 Å.

ThN19 • Background subtraction method for Raman spectra, I.K.Mihailuk, A.P.Razjivin, *Moscow State Univ., Russia,* The method for background subtraction from experimental spectra such as Raman spectra is proposed. The scale differences of legitimate and background signal is used in this method. Application to Raman spectra treatment is demonstrated.

ThN20 • Unusual mechanism of media polarity influence on the fluorescence lifetime of nonplanar porphyrins, I.V.Sazanovich, V.S.Chirvony, V.A.Galievsky, *Inst. of Mol. and Atomic Phys. Belarus.* Strong dependence on media polarity was found for fluorescence lifetimes and absorption-emission shift of the three nonplanar saddled porphyrins studied. The new mechanism of media polarity influence on radiationless deactivation was suggested.

ThN21 • Determination of molecular parameters of humic substances using the complex laser spectroscopy method, V.V.Fadeev, I.V.Boychuk, T.A.Dolenko, K.V.Anikin, *Moscow State Univ., Russia.* The possibilities of photophysical parameters determinarion of humic substances (within the framework of the two-fluorofors model) by means of the laser spectroscopy complex method, including time-resolved spectroscopy, nonlinear fluorimetry, and artificial neural networks, are shown in this work.

ThN22 • Determination of the photosynthesis organisms photophysical parameters by the method of non-linear fluorimetry, V.V.Fadeev, D.V.Maslov, P.N.Litvinov, S.A.Burikov, *Moscow State Univ., Russia.* In the report results of computer modelling and Phys. experiments which shown possibility of creation of the three-parametrical model of photosynthesising organisms fluorescence formation and of determination of these parameters by the method of non-linear fluorimetry are presented.

ThN23 • Peculiarities of dynamics of molecular multilevel systems in a powerful laser field analytical solutions, V.A.Savva, V.I.Zelenkov, O.V.Khlus, *Stepanov Inst. of Phys., Belarus.* The analytical solutions of the equations describing coherent dynamics of various multilevel systems excited by radiation are given. The peculiarities of excitation connected with detuning from a resonance, with anarrangement and amount of levels, with character of changes of dipole moments of transitions in system, along with peruliarities of excitation in a pulse laser field are given.

ThN24 • New applications of power excimer lasers, K.Znosko, A.Volodenkov, A.Anufrik, D.Ritchik, *State Univ. of Grodno, Belarus.* Apart from usually using, new kinds of application of power excimer lasers are discussed. Their radiation was used to improve surface properties of alloys, adhesion between metal coatings and surface, to affect on proteins and their activity.

ThN25 • Photo-stimulated hydrodynamic phenomena in biostructures and their medical applications, G.I.Zheltov, E.I. Vitkin, A.S.Rubanov, *Stepanov Inst. of Phys., Belarus.* Hydrodynamic response of biological media on irradiation by power short laser pulses is investigated theoretically. Early diagnostic and selective disruptive action to different pathological new growths are considered by using dependencies of the response parameters on Phys. properties of tissues.

ThN26 • Red-edge excitation effect in intramolecular proton transfer in flavonols, J.V.Kruchenok, N.A.Nemkovich, A.N.Sobchuk, E.P.Petrov, A.N.Rubinov, *Inst. of Phys., Belarus,* V.G.Pivovarenko, *Natl Taras Shevchenko Univ., Ukraine,* W.Baumann, *Univ. of Mainz, Germany.* Results of steady-state and time-resolved fluorescence investigations of 4'-diethylamino and 4'-(15-azacrown-5) derivatives of 3-hydroxyflavone in aprotic solvents and human erythrocyte membranes are presented. The dependence of the efficiency of excited-state intramolecular proton transfer in the flavonols on the excitation frequency was observed for the first time.

ThN27 • Kinetic description of dioxygen binding to human hemoglobin on the 1-100 ns time scale, I.V.Sazanovich, V.A.Galievsky, B.M.Dzhagarov, *Inst. of Mol. and Atomic Phys., Belarus,* J.Karpiuk, J.Waluk, *Inst. of Phys. Chem., Poland,* E.P.Petrov, *Stepanov Inst. of Phys., Belarus.* We present results of laser kinetic spectroscopy studies of geminate stages of dioxygen binding to human hemoglobin. It is found that the kinetic of this reaction cannot be described as a single-exponential process on 1–100 ns time scale.

ThN28 • About the mechanism of ultrafast relaxation of excited electronic states of cis-isomers of the ethylene-bridged porphyrin dimers, S.I.Shishporenok, V.S.Chirvony, *Inst. of Mol. and Atomic Phys., Belarus.* The results of the spectral, photophysical and quantum-chemical investigations of *cis*-isomers of the ethylene-bridged porphyrin dimers are presented. An explanation of possible mechanisms responsible for the observed ultrafast excited $^1(p,p^*)$ state deactivation is proposed.

ThN29 • Extra-ligation and screening effects upon interaction of photoinduced excited states of multiporphyrin arrays with molecular oxygen in solutions, E.I.Zenkevich, E.I.Sagun, V.N.Knyukshto, A.M.Shulga, *Inst. of Mol. and Atomic Phys., Belarus,* C.von Borczyskowski, *Univ. of Technology Chemnitz, Germany.* Using laser nanosecond methods it was shown that the quenching of T_1-exited porphyrin chemical dimers, triads and pentads by oxygen in solutions at 293 K depends essentially on the extra-ligation, interporphyrin bridge and screening effects.

ThN30 • Formation of reactive nitric oxide derivatives under action of UV and visible light on S-nitrosocompounds in the presence of photosensitizers, I.Stepuro, R.Adamchuk, *Inst. of Biochem., Belarus,* V.Stepuro, *Grodno State Univ., Belarus.* Under the action of UV and visible light S-notrosocompounds and particularly S-notrosoproteins dissociate and produce NO under anaerobic conditions and NO-derived reactive intermediates in the presence of oxygen.

ThN31 • Photoinduced electron transfer in self-organized triad system consisting of positive charged porphyrin-antraquinone dyad and negative charged chlorin molecule, D.I.Volkovich, I.N.Nichiporovich, S.A.Tikhomirov, A.M.Shulga, K.N.Solovyov, *Inst. of Mol. and Atomic Phys., Belarus.* The processes of photoinduced electron transfer in 5-antraquinonyl, 10,15,20-tris(3-N-methylpyridiniumyl) porphyrin triiodide (AQ-TriMetPyrPI$_3$) as well as in triad consists of (AQ-TriMetPyrPI$_3$) and tetrasulfophenylchlorin (TSPC) were investigated by picosecond spectroscopy methods. It is determined that sequential two steps electron transfer chlorin→porphyrin→antraquinone takes places in triad system.

ThN32 • Time-resolved and steady-state fluorescence of β-NO$_2$-substituted porphyrins, A.Yu.Panarin, I.V.Sazanovich, S.I.Shishporenok, V.Chirvony, *Inst. of Mol. and Atomic Phys., Belarus,* A.van Hoek, *Agricultural Univ., The Netherlands.* A series of model β-NO$_2$-substituted free base tetraphenylporphyrins is studied by the methods of steady-state and time-resolved fluorescence spectroscopy. 10-ps dynamics of the fluorescence spectrum Stokes shift is found and ascribed to the conformational rearrangement of the nitro group.

ThN33 • The interactions of intercalators with calf thymus DNA: photochemical and pulse radiolysis studies, M.Wolszczak, *Tech. Univ. of Lodz, Poland,* C.Peszynski-Drews, *Center of Excellence, Appl. of Laser Tech. and Biomaterials in Medicine, Poland.* We have studied the basic concept in drug-DNA interaction, especially the forces govern intercalation. The drugs designed for this purpose consist of an antracene chromophores linked by positively charged polyamide chains. The effects of variation of length, rigidity and number of N^+ cationic groups on the binding efficiency in a series of bis-intercalators were examined.

ThN34 • Axial coordination of Ni-porphyrins in solution studied by resonance Raman spectroscopy, V.V.Ermolenkov, S.G.Kruglik, V.A.Orlovich, *Stepanov Inst. of Phys., Belarus,* P.-Y.Turpin, *Univ. Pierre et Marie Curie, France.* Photoinduced and stationary axial ligation changes for meso-substituted Ni-tetraaryllporphyrins Ni(TMpy-P4) in water and NiTPP in benzene/piperidine were studied with resonance Raman spectroscopy.

ThN35 • Ricin, ricin agglutinin, and ricin binding subunit structural comparison by Raman spectroscopy, N.N.Brandt, A.Yu.Chikishev, A.I.Sotnikov, *Moscow State Univ., Russia,* Yu.A.Savochkina, I.I.Agapov, *State Sci. Centre "GNIIgenetika", Russia,* A.G.Tonevitsky, *Inst. for Transplantology and Artificial Organs, Russia.* Raman spectroscopy is used to study conformation-sensitive vibrational bands of the plant toxins in aqueous solution. The analysis of the Raman data yields the conformational state of the protein molecules differing from that predicted by the X-ray data.

ThN36 • Multiple light scattering by suspensions of aggregating erythrocytes in geometrical optics approximation, V.V.Lopatin, A.V.Priezzhev, *Moscow State Univ., Russia.* On the base of geometrical optics approximation the method of calculation of multiple light scattering by aggregating erythrocytes in whole blood is developed. The spaces between the particles and nonsphericity of the single erythrocyte were taken into account.

ThN37 • UV laser-induced fluorescence of sex hormones, V.I.Fedorov, O.P.Cherkasova, Yu.P.Meshalkin, E.S.Samoilova, *Inst. of Laser Phys., Russia.* It was demonstrated for the first time that representatives of all classes of sex hormones (androgens, estrogens, and progestins) are capable of fluorescence induced by the 4-th harmonic of Nd:YAG laser (266 nm). Quantum yield of laser-induced fluorescence of these hormones varies from 1.16 10^{-2} to 2.87 10^{-6}. The spectra of laser-induced fluorescence of the steroid hormones were obtained. The fluorescence maximum of the most of hormones

varies from 302 to 311 nm. The full width at half maximum varies from 15 to 32 nm.

ThO • Quantum and Atomic Optics

ThO1 • Characteristics of bright squeezed light produced in a below-threshold optical parametric oscillator (OPO), E.G.Lariontsev, I.I.Zolotoverkh, *Moscow State Univ., Russia.* We analyze quantum noises in a below-threshold OPO operating as an amplifier with an input seed wave. We show that, due to the nonlinear losses in the process of frequency doubling of the subharmonic wave, squeezing in bright beams produced by the OPO depends on their intensity. For the amplitude-squeezed state, squeezing strongly degrades with increasing the output intansity. For the bright phase-squeezed beams, one can obtain good squeezing.

ThO2 • Random walking of an atom in a standing-wave field and interaction of nonlinear resonances, S.V.Prants, V.Yu. Sirotkin, *Pacific Oceanolog. Inst., Russia.* A new effect of random walking of an atom in a coherent standing-wave laser field in a high-finesse Fabry-Perot cavity is found. The effect is caused by the interaction of two nonlinear resonanses, which result in formation of a stochastic layer. It opens a way for searching for dynamical localization in a new class of quantum systems.

ThO3 • Echo-spectroscopy of squeezed vacuum, A.M.Basharov, V.D.Popov, *Moscow Engin. Phys. Inst., Russia.* It is shown that the usual two-pulse photon echo in additional nonresonant squeezed field is simpler than the one produced with the participation of resonant squeezed wave and allow performing detailed analysis of squeezed field.

ThO4 • Optical patterns sustained by quantum noise, R.Zambrini, M.San Miguel, P.Colet, *IMEDEA (CSIC-UIB), Spain,* S.M.Barnett, *Univ. of Strathclyde, UK.* Optical parametric oscillator with walk-off, in convective unstable regime, displays noise-sustained patterns as a macroscopic manifestation of amplified and spatially structured quantum noise. We characterize the quantum fluctuations and correlations in these patterns.

ThO5 • Atom motion in helical doughnut beams, M.E.J.Friese, J.A.Andersen, Z.Ficek, H.Rubinsztein-dunlop, *Univ. of Queensland, Australia.* We demonstrate the mechanical effect of laser light carrying orbital angular momentum, on cold rubidium atoms. We show that counter-propagating doughnut beams can either cool or heat atoms, depending on the sense of the helicity.

ThO6 • The dipole force rectification in a light field formed by elliptically polarized waves, O.N.Prudnikov, A.V.Taichenachev, A.M.Tumaikin, V.I.Yudin, *Novosibirsk State Univ., Russia.* It is shown that the dipole force rectification is possible in a monochromatic laser field formed by elliptically polarized waves even at zero magnetic field. Optimal field parameters and a maximum of the rectified force are calculated for a number of optical transitions $J_g \to J_e$.

ThO7 • Symmetry relations for the light force acting on atom, A.V.Taichenachev, A.M.Tumaikin, V.I.Yudin, *Novosibirsk State Univ., Russia.* Symmetry relations for the light force are systematically derived, starting from the generalized optical Bloch equations for the atomic density matrix. For laser field configurations formed by elliptically polarized waves these relations have unexpected form, leading to the possibility of new kinetic effects.

ThO8 • Controlling Kapitza-Dirac effect with interference, A.M.Ishkhanyan, *Engin. Center, Armenia.* The coherent standing-wave scattering problem for rather general initial conditions involving initial atomic wave packet splitting in the momentum space is considered. It is shown that it is possible to choose a superposition of considered specific initial states to achieve a final diffraction pattern of arbitrary form.

ThO9 • Perturbation of non-ground stationary states in atomic Bose-Einstein condensate, V.V.Serov, V.L.Derbov, *Saratov State Univ., Russia,* S.I.Vinitsky, V.I.Yukalov, *Joint Inst. for Nuclear Res., Russia.* New features (e.g., coupling of topologically different modes) are found theoretically in perturbed non-ground stationary states of atomic Bose-Einstein condensate in harmonic trap. Transitions to lower states are shown to occur only under anharmonic trap modulation.

ThO10 • Bose-Einstein condensation in low-dimensional structures in a non-dissipative optical lattice, A.V.Taichenachev, A.M.Tumaikin, V.I.Yudin, *Novosibirsk State Univ., Russia.* The low-dimensional BEC in non-dissipative optical lattices are considered in the case when additional cooling is provided by the sideband Raman cooling method.

ThO11 • Detection and correction of errors with quantum tomography, Z.S.Sazonova, *Moscow Automobile and Road Construction Ins., Russia,* R.Singh, *General Phys. Inst., Russia.* It is shown that quantum tomography can detect and correct unlimited number of errors during the evaluation of quantum algorithms on quantum computer.

ThO12 • A multiparticle quantum channel for teleportation and dense coding, V.N.Gorbachev, A.I.Trubilko, *Univ. of St-Petersburg, Russia,* A.I.Zhiliba, *Tver State Univ., Russia.* For a multiparticle quantum channel the dense coding protocol and an enhancement of the classical capacity is found. The channel allows to teleport some entangled states using a collection of schemes, particularly involved the non Bell-state measurement.

ThO13 • Noise-free quantum nondemolition measurements of optical solitons, D.A.Ivanov, *St.-Petersburg State Univ., Russia,* V.V.Kozlov, *Univ. Ulm, Germany.* Quantum-nondemolition measurements of quantum solitons in optical fibers suffer from phase noise introduced by self-phase modulation. We propose the arrangement for homodyne detection, which is free of this noise.

ThO14 • Theoretical study of atoms dynamics in optical dipole trap, D.N.Yanyshev, B.A.Grishanin, V.N.Zadkov, *Moscow State Univ., Russia.* Theoretical study and computer simulation results for stochastic dynamics of two atoms trapped in an optical dipole trap under the action of a probe resonant radiation are presented. The radiation force correlations resulting from our model lead, in addition to cold collisions, to a tendency for atoms escape in pairs from the trap.

ThO15 • Conditioned atomic state and quantum interference in resonance fluorescence with spectral resolution, V.N.Shatokhin, S.Ya.Kilin, *Stepanov Inst. of Phys., Belarus.* Conditioned atomic state following a detection of a spectrally resolved photons is studied in the limit of well separated spectral lines. Effects of quantum interference between the dressed atomic states on this state are discussed.

ThO16 • Nonclassical states of one-atom laser, S.Ya.Kilin, T.B.Karlovich, *Stepanov Inst. of Phys., Belarus.* An analutical solution for Glauber P-distribution of one-atom laser field in the case of strong atom-field interaction is obtained. Sub-poissonian statistics, generation without inversion and entanglement between atom and field states are investigated.

ThO17 • Quantum computing with nonclassical polarization states of light, A.Yu.Leksin, A.V.Prokhorov, A.P.Alodjants, S.M.Arakelian, *Vladimir State Univ., Russia.* The quantum logical elements based on the spatially inhomogeneous physical systems and nonlinear optical interferometers (with Kerr-type optical fiber or Bose-Einstein condensate in one arm) have been considered. The possibility of formation and detection of nonclassical entangled polarization states in such a systems has been discussed as well.

ThO18 • Dark state resonances in Sm vapour in the presence of velocity changing collisions, A.V.Akimov, N.N.Kolachevsky, V.N.Sorokin, N.A.Kiselev, S.I.Kanorsky, *Lebedev Phys. Inst., Russia.* The method of bichromatic velocity selective optical pumping (VSOP) enables a measurement of cross-sections of velocity changing collisions and the profile of dark resonance. We represent the experimental results of VSOP in ^{154}Sm atom.

ThP • Optical Information Processing, Transmission, and Storage

ThP1 • Cooperative Raman-type transitions in the system of two four-level atoms: Entanglement in the spin subsystem of two spatially resolved atomic ensembles, D.V.Kupriyanov, A.V.Slavgorodskii, I.M.Sokolov, *State Technical Univ., Russia.* We describe the optical coupling of two four level atoms via the cooperative Raman scattering of the correlated photons of spontaneous parametric radiation. This leads to entanglement between transverse macroscopic spin fluctuations of two spatially resolved atomic ensembles.

ThP2 • Bistability of acoustooptic interaction in gyrotropic crystals with electroinduced anisotropy, S.N.Kurilkina, M.V.Shuba, *Gomel State Univ., Belarus.* It has been established that presence of gyrotropy leads to doubling the number of bistable regions of acoustoelectrooptic interaction in cubic crystals, which are achieved by changing the wave detuning, incident light intensity and ultrasonic power.

ThP3 • The influence of a longitudinal magnetic field on the behavior of the speckle-pattern of the light, transmitted through optical fiber, V.V.Anikeyev, M.V.Bolshakov, N.D.Kundikova, A.I.Valeyev, V.S.Zinatulin, *Inst.of Electrophys. and South Urals State Univ., Russia.* The influence of magnetic field on behavior of the speckle-pattern of light, transmitted through optical fiber, was investigated. The dependence of speckle pattern angle rotation on the strength of applied magnetic field was obtained.

ThP4 • Optical logic elements on the base of fibre Bragg reflectors, V.A.Pilipovich, A.K.Esman, I.A.Goncharenko, V.K.Kuleshov, *Inst. of Electronics, Belarus.* The logical elements with three inputs which is based on complex fibre Fabry-Perrot resonators formed by two Bragg reflectors and one end mirror has been proposed. Such a logical element producing function of half-adder in an one switching tact can be used for algorithmic acceleration of optical computing.

ThP5 • Acceleration of arithmetic operation performing by the use of spectral compression, V.A.Pilipovich, A.K.Esman, V.S.Posedko, V.K.Kuleshov, I.A. Goncharenko, *Inst. of Electronics, Belarus.* The architecture of parallel optoelectronics adder, in which the spectral compression correspondingly inputs permits to accelerate algorithmically optical data arrays processing, has been developed. This approach excludes galvanic connections correspondingly inputs/outputs and make it possible to perform parallel computation in wide frequency bandwidth.

ThP6 • Maximum achievablle efficiencies for pulse position modulation in optical communication systems, M.A. Khodasevich, G.V.Sinitsyn, A.S.Yasukevich, *Div. for Optical Problems in Inform. Technologies, Belarus.* Limiting efficiences of optical communication systems with different kinds of pulse position modulation are considered within framework of number-state model. It is shown that overlapping pulse position modulation allows achieving the highest efficiency.

ThP7 • Optimization of low-noising hologram characteristics in photorefractive piezocrystals, V.V.Shepelevich, A.A. Firsov, *Mozyr State Pedagogical Inst., Belarus.* Influence of the piezoelectric effect on dependence of an amplification coefficient at cross-polarization coupling on orientation of a holographic grating vector is investigated for a BSO crystal at thickness 10 mm and Bragg angle 12°.

ThP8 • Laser beam modulation by surface droplets of liquid crystal, V.A.Loiko, Konkolovich A.V., *Stepanov Inst. of Phys., Belarus,* V.Ya.Zyryanov, A.N.Serebrennikov, A.V.Shabanov, V.V. Presnyakov, *Inst. of Phys., Russia.* The theoretical results on a new type of electrooptical modulator for laser beam are considered. It is based on the effect of coherent transmittance quenching in a thin layers of a polymer-dispersed liquid crystal films. Experimental verification is made for films with elongated bipolar nematic droplets.

ThP9 • Optical recording of stationary spatial gratings in a jelly-like dye-doped gelatin, T.Sh.Efendiev, V.M.Katarkevich, A.N.Rubinov, *Stepanov Inst. of Phys., Belarus.* Optical recording of stationary spatial gratings in a jelly-like dye doped gelatin is reported. Output characteristics of the distributed feedback (DFB) laser based on such material with recorded permanent gratings are investigated.

ThP10 • Planar devices for switching optical signals with the use of transverse effects in optical bistability, A.M.Goncharenko, G.V.Sinitsyn, S.P.Apanasevich, A.V.Lyakhnovich, A.A.Dokutovich, *Div. for Optical Problems in Inform. Technologies, Belarus.* Methods and devices for optically controlled switching of digital data in the plane of 2D array of bistable pixels are discussed. Their key feature is the use of transverse effects on optical bistability and so-called "transverse lock-and-clock" architecture.

ThP11 • Dynamics of switching waves and realization of shift register in optically bistable GaAs/GaAlAs interferometer, G.V.Sinitsyn, S.P.Apanasevich, A.V.Lyakhnovich, A.S.Yasukevich, M.A. Khodasevich, Yu.A.Varaksa, A.A.Dokutovich, *Div. for Optical Problems in Inform. Technologies, Belarus.* Dynamics of switching waves in optically bistable all-epitaxial GaAs/GaAlAs Fabry–Perot interferometer is studied experimentally. Realization of planar optical shift register based on propagation of switching waves between neighbour pixels in the plane of bistable layers is reported.

ThP12 • Methods of holographic protection and identification, L.V.Tanin, P.V.Moiseenko, V.V.Manikalo, S.A.Ryzhechkin, *Joint Venture "Hologtaphy industry", Belarus,* V.K.Erokhovets, *Inst. of Engin. Cybernetics, Belarus.* The methods of synthesis of holograms, which are visible in a polychromatic light, aimed at protection of documents and security papers are studied. The classification of holographic marks according to the degree of protection is given. The methods and means of holographic recordings' identification are analyzed.

ThP13 • Optimizing the performance of erbium doped fiber amplifier, A.Shrivastava (Khare), *Dept. of Electronics, GEC Bhopal, India.* This paper reports on analysis, how the nonlinearities depend on fibre parameters thereby effecting the performance of EDFA. The analysis contains measurement of gain and noise figure of EDFA for different level of pump power and reflectivity, on a system for optimizing noise figure.

ThP14 • Temporal interference of periodical pulse train in optical fibers, V.P.Minkovich, A.N.Starodumov, *Centro de Investigaciones en Optica, Mexico,* V.I.Borisov, V.I.Lebedev, S.N.Perepechko, *Mogilev State Univ., Belarus.* Some peculiarities of transmission for periodical pulse train through the media with dispersion have been investigated both theoretically and experimentally. Experimentally observed dispersion effects for a continuous train of optical pulses and for a group of two and seven pulses at distanse of 300 m and 1200 m in a multimode optical fiber have been explained in the context of the examined theoretical model.

ThP15 • Stabilization of dissipative soliton sequences in fibers by self-phase-modulation feedback, A.K.Komarov, K.P.Komarov, *Inst. of Automation and Electrometry, Russia.* Stabilization and multistability of dissipative solitons in fibers with gain and saturable absorption have been found. The number of stable states and the parameters of transient process have been determined in terms of parameters of fiber line.

ThP16 • Cascade acousto-optic diffraction for communication systems, V.Kotov, G.Shkerdin, *Inst. of Radioengin. and Electronics, Russia,* J.Stiens, R.Vounckx, *Vrije Univ. Brussel, Belgium.* Cascade acousto-optic (AO) diffraction based on the Bragg polarization splitting effect is proposed and investigated. The wavelength-division-multiplexing (WDM) and the optical image compressing on the basis of the proposed diffraction are discussed.

ThP17 • Quantum cooperative cluster—a new basic element for optical parallel computers, S.N.Bagayev, *Inst of Laser Phys., Russia,* V.S.Egorov, V.J.Dmitriev, I.A.Chekhonin, M.A.Chekhonin, *St.-Petersburg State Univ., Russia.* Quantum cooperative cluster is an optical microcavity + dot computer generated hologram with N-wave coherent pump. The coherent superposition of the pump waves coincides in phase with the cavity mode, has the supercritical coupling with an atomic ensemble in a cavity, and appears to be a source of the parametric excitation of the superradiance in a microcavity.

ThP18 • Dynamic and stationary holographic recording in rigid solutions of organic dyes, Yu.D.Lantukh, S.N.Letuta, E.K.Alidjanov, S.N.Pashkevitch, *Orenburg State Univ., Russia.* The work is devoted to investigation of two types of holographic recording in dye-polymer systems. The base of dynamic recording is the triplet photochromism. Stationary reversible relief-phase holograms were examined by scanning probe microscopy.

ThP19 • Experimental study of light-induced birefringence in an azo-containing polymer film, Nesterouk K.S., Nikolaev I.P., Simonov A.N., Larichev A.V., Moscow State Univ., Russia. The refractive index dynamics of an azo-containing polymer film illuminated with a laser beam is experimentally studied. Optimal conditions are determined for dynamic recording in the polymer sample.

ThP20 • Computer simulation of the wavefront correction system with local curvature sensing, V.O.Militsin, S.A.Shlenov, *Moscow State Univ., Russia,* A.V.Kudryashov, *Inst. on Laser and Inform. Technologies, Russia.* The problem of optimization of the wavefront correction system with local curvature sensor is discussed. Computer simulations are based on ray-tracing method. The analysis was made for 60-element sensor based on lenslet and CCD-camera.

ThP21 • Nd:YAG laser with independent chamels for illumination and heat-developed of holographic recording on photothermoplastic materials, A.A.Kovalev, S.N.Zhdanovich, *Inst. of Electronics, Belarus.* Two-channel Nd:YAG laser with intracavity polarization decoupling of channels is designed to be used in devices for the recording and development of holograms on photothermoplastic materials.

NOTES

Hall 1

8:30–10:30
FA • Seminar on Nonlinear Materials I
TBA, *Presider*

8:30
FA1 (Keynote) • Effects of frequency self-conversion in $\chi^{(2)}$ and $\chi^{(3)}$ activated laser-nonlinear crystals, V.G.Dmitriev, *R&DI "Polus", Russia*, A.A.Kaminsky, *Inst. of Crystallography, Russia.*

Hall 2

8:30–10:30
FB • Nonlinear Optical Phenomena III
K.-I. Ueda, *Univ. of Electrocommunications, Japan, Presider*

8:30
FB1 (Invited) • Raman fiber lasers and amplifiers, I.A.Bufetov, *General Phys. Inst., Russia.* The state of the art and potentialities of current cw Raman fiber lasers and amplifiers are considered in connection with the present-day technology level of highly phosphorus doped (10 ÷15 mol% P_2O_5) and highly germanium doped (up to 30 mol% GeO_2) single-mode fibers and standard fibers.

9:00
FB2 • Second harmonic generation by reflection of an elliptically polarized laser beam from a chiral liquid under the different incident angles, P.M. Bogdanovich, V.A.Makarov, *Moscow State Univ., Russia.* Noncollinear interactions of the spatial Fourier components of elliptically polarized Gaussian beam under the oblique incidence on surface of a chiral liquid play a key role in formation of reflected beam at the doubled-frequency with strongly nonuniform distribution of polarization and complex intensity distribution over its cross-section.

Hall 3

8:30–10:30
FC• Ultrafast Phenomena I
A.N.Rubinov, *Stepanov Institute of Physics, NANSB, Belarus, Presider*

8:30
FC1 (Invited) • Ultra-short pulse solid-state lasers and modern applications, E.Wintner, *Techn. Univ. Wien, Austria.* Many broadband transition metal ion-doped solid-state laser oscillators are capable of emitting pulses in the 10-fs regime allowing outstanding new applications. However, rare earth doped laser materials are chosen if high average diode-pumped output power and ps or sub-ps pulse durations are desired.

9:00
FC2 (Invited) • Femtosecond interactions and optical gain in semiconductor quantum dots, V.I.Klimov, *Los Alamos Natl. Lab., USA.* We examine competing dynamical processes involved in optical amplification and lasing in colloidal quantum dots. We demonstrate that despite a highly efficient nonradiative Auger recombination, stimulated emission and lasing spectrally tunable with the dot size can be developed in close-packed solids of these dots.

Hall 4

8:30–11:00
FD • Quantum and Atomic Optics III
A.S.Chirkin, *Moscow State Univ., Russia, Presider*

8:30
FD1 (Invited) • Cavity assisted quasi-particle damping in a BEC, S.A.Gardiner, *Univ. Potsdam, Univ. Hannover, Germany*, K.M.Gheri and P.Zoller, *Univ. Innsbruck, Austria.* We show how energy from a Bose-Einstein condensate interacting with a lossy optical cavity mode and laser fields can be coupled from the condensate to the cavity mode, where it subsequently dissipates, in a controlled manner.

9:00
FD2 (Invited) • Nonclassical states, switching and macroscopic dynamics for multicomponent Bose systems, A.P.Alodjants, S.M.Arakelian, *Vladimir State Univ., Russia.* We discuss quantum and classical properties of two-component Bose gases in quantum and atomic optics. The quantum theory of self-switching effects, phase transition and squeezed states formation for population imbalance and phase difference in two-components of Bose-condensate have been developed. The problem of quantum computing is discussed as well.

Hall 5

8:30–10:30
FE • Nonlinear Dynamics of Optical systems I
A.S.Rubanov, *Stepanov Inst. of Physics, NASB, Belarus, Presider*

8:30
FE1 (Keynote) • Nonlinear dynamics and chaos in solid-state lasers, N.V.Kravtsov, E.G.Lariontsev, *Moscow State Univ., Russia.* We report on theoretical and experimental studies of phase phenomena in nonlinear dynamics of solid-state lasers (SSL): phase shifts in selfmodulation oscillations of solid-state ring lasers (SSRL), phase synchronization of chaos in counterpropagating waves in SSRL, and nonlinear phase shifts in SSL with intracavity SHG.

Hall 1

FA • Seminar on Nonlinear Materials I (Continued)

9:15
FA2 (Invited) • New materials for nonlinear optics, O.L.Antipov, A.S.Kuzhelev, *Inst. of Appl. Phys., Russia,* R.E.Benfield, R.G.Jones, *Univ. of Kent, UK,* B.A.Bushuk, A.N.Rubinov, *Stepanov Inst. of Phys., Belarus,* G.A.Domrachev, L.G.Klapshina, V.V.Semenov, G.A.Razuvaev, *Inst. of Metallo-organic Chem., Russia,* W.E.Douglas, *Univ. Montpellier II, France.* A variety of novel materials has been synthesized including poly(arylene)(ethynylene)silylene]s containing hypercoordinate silicon, and films of metal-containing polyacrylonitrile materials. The $\chi^{(3)}$ and photorefractive properties in various matrices have been investigated, the $\chi^{(3)}$ values being outstandingly high.

9:45
FA3 (Invited) • Nonlinear optical crystals for laser frequency conversion: present state and development outlooks, L.I.Isaenko, A.P.Yelisseyev, *Design & Technological Inst. of Monocrystals, Russia.* Information on known nonlinear optical crystals (NLO), state of their growth technology and application features are reviewed. Requirements to new NLO crystals are formulated basing on the composition-structure-property correlations, particular attention being paid to ferroelectric crystals, where periodic structures can be realized.

Hall 2

FB • Nonlinear Optical Phenomena III (Continued)

9:15
FB3 (Invited) • Frequency conversion of Bessel light beams in nonlinear crystals, V.N.Belyi, N.S.Kazak, N.A.Khilo, *Stepanov Inst. of Phys., Belarus.* The results of theoretical and experimental investigations of properties of frequency conversion of Bessel light beams by nonlinear crystals are presented. The regime of azimuthally correlated interactions for Bessel beams of zero- and higher-orders is investigated in detail.

9:45
FB4 • Second harmonic generation of hollow Bessel beams, V.Jarutis, A.Matijošius, A.Piskarskas, V.Smilgevičius, A.Stabinis, *Vilnius Univ., Lithuania.* The investigation results of SH generation of hollow Bessel beams (Bessel vortices) in KTP crystal are presented. An angular distribution of SH radiation of Bessel vortices consists of central spot and outer ring. The decay of doubly charged vortices is caused by accompanying J_0 beam at the crystal input.

Hall 3

FC• Ultrafast Phenomena I (Continued)

9:30
FC3 (Invited) • Towards optimal generation and delivery of 1 fs pulses in dispersive media, Misha Ivanov, *Steacie Inst. for Mol. Sci., Canada.* We discuss pump-probe scheme of generating and delivering single pulses as short as 1 fs onto the target, through known dispersive elements in the optical setup.

Hall 4

FD • Quantum and Atomic Optics III (Continued)

9:30
FD3 • Dynamics of Bose-Einstein condensate with nonlocal interactions near collapse, V.V.Konotop, *Univ. de Lisboa, Portugal,* V.M.P□rez-Garc□a, J.J.Garc□a-Ripoll, *Univ. de Castilla-La Mancha, Spain.* The effect of nonlocality on dynamical properties of Bose-Einstein Condensate with positive scattering length are studied. It is shown that nonlocal interaction prevents collapse but originates oscillations of the wave packet with a localized component.

9:45
FD4 • Superelastic scattering of excited atoms on a solid surface: Efficient transfer of the photon energy into atomic motion, A.M.Bonch-Bruevich, V.V.Khromov, S.G.Przhibel'skii, V.N.Smirnov, T.A.Vartanyan, *Vavilov State Optical Inst., Russia.* Efficient transformation of the photon energy into kinetic energy of atoms in the course of superelastic scattering on a solid surface has been observed for the first time. Kinetic energy and angle distributions of departing atoms are studied in detail.

Hall 5

FE • Nonlinear Dynamics of Optical systems I (Continued)

9:15
FE2 (Invited) • Exploiting instabilities and chaos of semiconductor lasers, D.Lenstra, S.Wieczorek, M.Yousefi, *Vrije Univ. Amsterdam, The Netherlands.* Recent theoretical work towards understanding and useful application of nonlinear dynamics and chaos of semiconductor lasers will be reviewed.

9:45
FE3 (Invited) • Dynamics in lasers involving more than one field: driven atomic systems and coupled microchip systems, R.Vilaseca, J.L.Font, J.J.Fernández, C.Serrat, J.García-Ojalvo, M.C.Torrent, A.Kul'minskii, *Univ. Politècnica de Catalunya, Spain.* We study temporal and/or spatial dynamics in lasers with: (a) one driving and one lasing fields –lasing without inversion and hyper-Raman lasers-; and (b) multi-field emission: cascade and multimode two-photon lasers and coupled microchip lasers.

Hall 1

FA • Seminar on Nonlinear Materials I (Continued)

10:15
FA4 • Principles of search for new self-frequency doubling laser crystals, B.I.Kidyarov, *Inst. of Semicond Phys., Russia,* E.V.Pestryakov, *Inst of Laser Phys., Russia.* Principles of search for new self-frequency doubling (SFD) laser crystals have been discussed. It's shown that the chemical bond lengths and dimension of impurity ions are the most informative criterions for search of promising SFD laser crystals.

Hall 2

FB • Nonlinear Optical Phenomena III (Continued)

10:00
FB5 • Efficient intracavity second harmonic generation of CO_2 lasers with nonlinear $AgGaSe_2$ crystals, V.O.Petukhov, V.A.Gorobets, S.Ya.Tochitsky, V.V. Churakov, V.N.Jakimovich, V.I.Konstantinov, *Stepanov Inst. of Phys., Belarus.* $AgGaSe_2$ crystals with negligible absorption (up to 0.008 cm^{-1}) have been grown. A number of novel optical intracavity schemes, allowing enhancing efficiency of SHG for both TEA and cw CO_2 lasers were proposed and experimentally realized.

10:15
FB6 • Enhancement of sum-frequency generation near the photonic band gap edge under the quasi-phase-matching conditions, A.V.Balakin, V.A.Bushuev, B.I.Mantsyzov, I.A.Ozheredov, A.P.Shkurinov, *Moscow State Univ., Russia,* P.Masselin, G.Mouret, *Univ. du Littoral, France.* It is shown theoretically and experimentally, that near the photonic band gap edge of nonlinear multilayer structure the efficiency of conversion in sum-frequency can be significantly enhanced if two conditions are fulfilled simultaneously: quasi-phase matching and non-phase-matching enhancement. The role of each mechanism is discussed.

Hall 3

FC• Ultrafast Phenomena I (Continued)

10:00
FC4 • Ultrafast THz generation from InAs surface using toroidal permanent magnet, V.G.Bespalov, V.Krylov, D.I.Staselko, *S.I.Vavilov State Optical Inst., Russia.* The investigation of terahertz radiation from InAs surface excited by 100 fs Ti:sapphire laser using different magnetic systems are reported. In 1.0 T magnetic field with pumping by 150 mW of average power the maximum THz efficiency of 10^{-4} was reached.

10:15
FC5 • Efficient ultrashort light pulses conversion in GHz-THz pulses in ZnTe, GaAs, DAST crystals, A.S.Nikoghosyan, E.M.Laziev, *Yerevan State Univ., Armenia,* A.A.Hakhoumian, R.M. Martirosyan, *Inst. of Radiophys. & Electronics, Armenia.* The potentiality to increase light pulse conversion efficiency into pulses of the GHz-THz range using the waveguide partially filled with nonlinear crystal is suggested. This technique has been theoretically substantiated and experimentally studied. Phase matching is defined by the degree of partial filling. The calculated data as well as the experimental results of the difference frequency generation in ZnTe, GaAs and DAST crystals are presented. DAST refractive index as well as its tnδ have been measured up to 0.9 THz frequency range.

Hall 4

FD • Quantum and Atomic Optics III (Continued)

10:00
FD5 • Quantum trajectory dynamics of macroscopic medium at the emission of single photon echoes, S.A.Moiseev, *Zavoisky Phys.-Techn. Inst., Russia,* S.Kroll, N.Ohlsson, *Lund Inst. of Technology, Sweden.* We study a single photon echo in coherent macroscopic medium using quantum measurement approach based on the Lindblad-type equations. It was founded that analytical solutions corresponding to different quantum trajectories are unusually differed in the properties of single photon echoes.

10:15
FD6 • Multiple-photon exchange in atom optics: intensity- and density-dependent effects, K.V.Krutitsky, K.-P.Marzlin, J.Audretsch, *Univ. Konstanz, Germany.* We have developed the quantum theory of the interaction of ultracold atomic ensemble with optical photons. The main attention has been paid to the consistent consideration of dynamical dipole-dipole interactions in the intense radiation field. We discussed possible ways to manipulate the center-of-mass motion of atoms using intense laser radiation.

10:30
FD7 (invited) • Zeeman "dark" and "bright" states in cesium by single mode excitation, E.Mariotti, V.Biancalana, A.Burchianti, C.Marinelli, L.Moi, *Univ. di Siena, Italy,* C.Andreeva, S.Cartaleva, Y. Dancheva, K.A.Nasyrov, *Inst. of Electronics Bulgaria.* We present systematic investigation of the coherent effects at the Zeeman sublevels of hf states of the D_2 line of Cs in vacuum or buffer gas cells. The narrow resonances have been detected by scanning across zero value a longitudinal magnetic field. The study has been done as a function of

Hall 5

FE • Nonlinear Dynamics of Optical systems I (Continued)

10:15
FE4 • Influence of chaotic regular perturbations in master oscillator signal on synchronized chaos in a system master-slave oscillators each being two-element array, A.P.Napartovich, A.G.Sukharev, *TRINITI, Russia.* Synchronization of chaotic lasing between master and slave oscillators each consisting of two diode lasers is studied numerically. Possibility to extract information signal modulating transmitter (master) output from slave laser output is evaluated.

Hall 1	Hall 2	Hall 3	Hall 4	Hall 5
			FD • Quantum and Atomic Optics III (Continued)	
			polarization and intensity of the single laser frequency exciting the atomic system.	

10:30–12:30 EXHIBIT ONLY TIME (coffee is served at the exhibit)

12:30–14:00 LUNCH (on your own)

Hall 1

14:00–16:00
FF • Seminar on Nonlinear Materials II
V.G.Dmitriev, *"Polyus" Research Inst., Russia, Presider*

14:00
FF1 (Invited) • Nonlinear optical properties of fullerene-containing media and laser optics, I.M.Belousova, O.B.Danilov, A.A.Mak, Research Institute for Laser Physics, Russia. We present the results of studies on application of nonlinear-optical properties of fullerene-containing media for design of optical limiters of laser radiation, writing-in of dynamic holograms, control for space-time parameters of laser radiation, and creation of high-efficiency fullerene-oxygen-iodine laser.

14:30
FF2 (Invited) • Development of femtosecond laser systems based on Cr and Ti doped beryllium aluminate crystals, E.V.Pestryakov, *Inst of Laser Phys., Russia,* A.I.Alimpiev, *Technological Inst. of Monocrystals, Russia,* V.N.Matrosov, *Belarusian State Polytech. Inst., Belarus.* Results studies of physical and laser properties of Cr^{3+} and Ti^{3+} doped $BeAl_2O_4$, $BeAl_6O_{10}$, $Be_3Al_2Si_6O_{18}$ and $BeLaAl_{11}O_{19}$ crystals are presented. It is shown that $BeAl_2O_4$:Ti and $BeAl_6O_{10}$:Cr crystals are perspective media for generation and amplification femtosecond pulses in NIR range.

Hall 2

14:00–16:00
FG • Nonlinear Optical Phenomena IV
A.Stabinis, *Vilnius Univ., Lithuania, Presider*

14:00
FG1 (Invited) • Modulational instability in quadratically nonlinear media: Role of dimensionality and measurement of the gain coefficients, G.I.Stegeman, R.Schiek, Hui Fang, R.Malendevich, *Univ. of Central and Florida, USA.* Modulational instability was studied experimentally in both bulk and waveguide media with quadratic nonlinearities near second harmonic generation phase-matching conditions. The effects of beam dimensionality are discussed and the gain coefficients measured.

14:30
FG2 (Invited) • Light propagation in dense resonant media: Intrinsic optical bistability, solitons and transients, A.A. Afanas'ev, V.I.Reshetnyak, R.A.Vlasov, V. M.Volkov, *Stepanov Inst. of Phys., Belarus,* O.K.Khasanov, O.M.Fedotova, D.V.Gorbach, T.V.Smirnova, *Inst. of Phys. of Solids and Semicond., Belarus.* Such effects as intrinsic optical bistability, soliton formation, photon echo and free polarization decay in dense resonant media are investigated. Local field effects associated with near dipole–dipole interaction between atoms are taken into account

Hall 3

14:00–16:00
FH• Ultrafast Phenomena II
E.Wintner, *Technical Univ. of Wienna, Austria, Presider*

14:00
FH1 (Keynote) • Ultrafast hydrated-electron dynamics, M.S.Pshenichnikov, A.Baltuska, D.A.Wiersma, *Univ. of Groningen, The Netherlands.* We present photon-echo and pump-probe experiments on the hydrated electron performed with sub-5-fs pulses. The pure dephasing time of electrons solvated in water is measured to be ~1.6 fs. The excited-state lifetime of the electron is found to be ~50 fs while the hot-ground state equilibration proceeds at a ps time scale.

Hall 4

14:00–15:45
FI • Quantum and Atomic Optics IV
L.Moi, *Univ. of Siena, Italy, Presider*

14:00
FI1 • Quantum computer with odd and even coherent states of light, D.B.Horoshko, S.Ya.Kilin, *Stepanov Inst. of Phys., Belarus.* We describe a model of quantum computer, where quantum information is encoded into odd and even coherent states of optical single-mode field, and processed by non-linear coupling of these modes via multi-wave cross-phase modulation.

14:15
FI2 (Invited) • Nonclassical light generation at consecutive and simultaneous QPM wave interactions, A.S.Chirkin, *Moscow State Univ., Russia.* We present the results of quantum analysis of two consecutive and simultaneous QPM three frequency processes wich can be realized in periodically poled nonlinear crystals. The processes under consideration are studied from the point of view of forming nonclassical light, photon statistics and entangled states at generated frequencies.

Hall 5

14:00–16:00
FJ • Nonlinear Dynamics of Optical systems II
G.M.Stephan, *ENSSAT, Laboratoire d'Optronique, France, Presider*

14:00
FJ1 (Invited) • Self-organization of nonlinear dynamic cavity in a high-average-power laser oscillator, O.L.Antipov, A.P.Zinoviev, D.V.Chausov, A.V.Afanas'ev, *Inst. of Appl. Phys., Russia.* The spatio-temporal mode formation in a laser oscillator with a cavity completed by refractive-index and gain gratings that accompany population gratings induced in Nd:YAG laser crystals by generating beams is investigated experimentally and numerically. Beams with an average power of up to 300W, near-diffraction-limited divergence, and long coherence length are generated.

14:30
FJ2 (Invited) • Vector and scalar spatial solitons in inhomogeneous magnetooptic planar waveguides, A.D.Boardman, Ming Xie, *Univ. of Salford, UK.* Magnetooptic vector, Manakov type, solitons are discussed as part of a modern development in nonlinear gyrotropic media. Nonreciprocity, leading to unidirectional soliton control is demonstrated together with signal transport shielding and storage applications for chip-level photonics.

Hall 1	Hall 2	Hall 3	Hall 4	Hall 5
FF • Seminar on Nonlinear Materials II (Continued)	**FG • Nonlinear Optical Phenomena IV (Continued)**	**FH• Ultrafast Phenomena II (Continued)**	**FI • Quantum and Atomic Optics IV (Continued)**	**FJ • Nonlinear Dynamics of Optical systems II (Continued)**
		14:45 ***FH2 (Invited) • Coherence, relaxation and reaction of solution-phase molecules studied by femtosecond nonlinear spectroscopy,*** Tahei Tahara, *Inst. for Mol. Sci., Japan.* Recent results of our femtosecond spectroscopic study on coherence, relaxation and reaction of solution-phase molecules are presented. Especially, wavepacket motions in the excited-states of stilbene and diphenylcyclopropenone observed using 10-fs pulses are discussed in detail.	*14:45* ***FI3 (Invited) • Quantum properties of the two-mode Kerr states,*** R. Tanaś, *Adam Mickiewicz Univ., Poland.* Quantum properties of the two-mode Kerr states such as squeezing, sub-Poissonian photon statistics, Schrödinger cats, quantum correlations between the modes, polarization and quantum depolarization, quantum noise in the Stokes parameters as well as quantum phase properties will be reviewed.	
15:00 ***FF3 • Second harmonic generation of Cr:forsterite femtosecond laser radiation in partially deuterated DCDA crystals,*** V.M.Gordienko, S.S.Grechin, A.A.Podshivalov, V.I.Pryalkin, A.A.Ivanov, Moscow State Univ., Russia, A.A.Ivanov, Center of Photochem., Russia. Group velocity matching second harmonic generation of Cr:forsterite femtosecond laser radiation was realized in partially deuterated DCDA crystals.	*15:00* ***FG3 (Invited) • Fundamental aspects of singular optics (optical vortices),*** M.S. Soskin, M.V.Vasnetsov, *Inst. of Phys., Ukraine.* The wave from phase singularities (optical vortices, etc.) possess new fundamental features. Their essential influence on variety of nonlinear phenomena (dark solitons, vortex street in seeded SHG, ultra-short pulses, etc.) is discussed.			*15:00* ***FJ3 • Oscillating and rotating states for laser solitons,*** S.V.Fedorov, N.N.Rosanov, A.N.Shatsev, *Inst. for Laser Phys., Russia,* N.A.Veretenov, A.G.Vladimirov, *St.Petersburg State Univ., Russia.* The scenario for stability loss of laser solitons is analyzed. The process of radial symmetry breaking and bistability between symmetrical and rotating solitons is demonstrated. New, rotating and oscillating soliton state is founded. The consequent period-doubling of symmetrical oscillations is found as a route to chaotic behavior.
15:15 ***FF4 • Second harmonic generation of femtosecond laser radiation in cesium triborate crystal,*** V.A.D'yakov, S.S.Grechin, V.I.Pryalkin, *Moscow State Univ., Russia.* The group velocity mismatch between the fundamental and second harmonic pulses was calculated and measured in cesium triborate crystal. Dispersion spreading length was calculated for 100 femtosecond pulses in the transparency range of CBO crystal.		*15:15* ***FH3 • Kinetics of stripes and pseudogap in high temperature superconductors,*** Petnikova V.M., V.V.Shuvalov, A.V.Voronov, *Moscow State Univ., Russia.* Kinetics of spatially uniform distribution of holes (so-called "stripes") in high-temperature superconducting films after their ultra-fast "heating" will be considered. Interpretation of experimental data, obtained by picosecond nonlinear spectroscopy of high-quality Y-Ba-Cu-O samples, will be performed.	*15:15* ***FI4 • Type-II biphotons with spectral properties of type-I biphotons,*** A.V.Burlakov, M.V.Chekhova, O.A.Karabutova, S.P.Kulik, G.O.Rytikov, *Moscow State Univ., Russia.* Anticorrelation effect is observed for type-II biphotons synthesized from type-I collinear spontaneous parametric down-conversion (SPDC) radiation. Combination of polarization properties of type-II with the spectrum of type-I SPDC suggests a convenient technique for precise group delay measurement.	*15:15* ***FJ4 • Twin beam generation in spatially coupled Nd:YVO4 microchip lasers,*** C.Serrat, M.C.Torrent, J.García-Ojalvo, R.Vilaseca, *Univ. Politècnica de Catalunya, Spain.* We study the synchronization of both the phase and intensity quantum-noise-driven dynamics in two spatially coupled lasers. We demonstrate the suppression of the dominant relaxation oscillations peak in the generated beams' intensity difference noise spectrum.

Hall 1	Hall 2	Hall 3	Hall 4	Hall 5
FF • Seminar on Nonlinear Materials II (Continued)	**FG • Nonlinear Optical Phenomena IV (Continued)**	**FH• Ultrafast Phenomena II (Continued)**	**FI • Quantum and Atomic Optics IV (Continued)**	**FJ • Nonlinear Dynamics of Optical systems II (Continued)**
15:30 ***FF5 • Stimulated Raman scattering in new $BaWO_4$ crystal,*** P.G.Zverev, T.T.Basiev, *General Phys. Inst., Russia.* Spontaneous Raman spectroscopy allowed us to predict new barium tungstate nonlinear crystal for SRS. Laser experiments with pico-, nano- and submicrosecond pump pulses showed high conversion efficiency to Stokes components and proved unique features of this crystal.	*15:30* ***FG4 • Intrinsic optical bistability in composite materials,*** K.C.Rustagi, S.Mukhopadhyay, *Centre for Adv. Technology, India.* We present an effective medium theory for nonlinear optical response of metal-insulator and semiconductor-semiconductor nano-composites. The phase of the nonlinearity is shown to determine the occurrence of optical bistability in such materials.	*15:30* ***FH4 • Ultrafast interfacial electron transfer in dye-sensitized TiO_2 films,*** A.Yartsev, G.Benkö, V.Sundström, *Lund Univ., Sweden.* Interfacial electron transfer in competition with intra-molecular energy relaxation and inter-system crossing from two photoexcited dyes into conduction band of TiO_2 microcrystallites was clearly time-resolved in the visible and near IR spectral regions.	*15:30* ***FI5 • Effects of instantaneous phase and Stark shift on two-photon process,*** M.M.Ashraf, Pakistan Inst. of Lasers and Optics, Pakistan. The effects of instantaneous phase shift experienced by the Nth atom on other atoms are presented. The effects of Stark shift on the probability amplitudes are also investigated. Our results show that one can trap and release the photon–pair/atom pair periodically.	*15:30* ***FJ5 (Invited) • Transient transverse and polarization mode selection in vertical-cavity surface-emitting lasers (VCSELs),*** J.Mulet, S.Balle, M.San Miguel, *Inst. Mediterraneo de Estudios Avanzados, CSIC-UIB, Spain,* C.R.Mirasso, *Univ. de les Illes Balears, Spain.* We investigate mode selection in VCSELs of different sizes subject to gain-switching events. Our numerical results based on a mesoscopic model are in agreement with experimental findings for the transient response of gain-guided VCSELs.
15:45 ***FF6 • New class of nonlinear optical crystals among arginine salts,*** A.M.Petrosyan, R.P.Sukiasyan, *Yerevan State Univ., Armenia,* R.S.Feigelson, *Stanford Univ., USA,* E.W.Van Stryland, *CREOL, Univ. of Central Florida, USA,* H.A.Karapetyan, *Mol. Struct. Res. Center, Armenia.* 11 new crystals from L-arginine phosphate monohydrate (LAP) family have been grown and characterized and strong phase-matched SHG detected in most of them. Seven crystals from this group belong to a new class with 1:2 composition of arginine: acid.	*15:45* ***FG5 • Bright spatial solitons of a stable width in a range of nonlinearity in strontium barium niobate crystal,*** V.Shandarov, *State Univ. of Control Syst. and Radioelectr., Russia,* D.Kip, M.Wesner, *Osnabrueck Univ., Germany.* An influence both of the input light beam parameters and the applied electric field value to characteristics of bright photorefractive spatial screening solitons in a strontium barium niobate crystal is studied. The features of results obtained are discussed.	*15:45* ***FH5 • Ultrafast charge carriers generation in C_{60} films, excited by femtosecond pulses at different wavelengths,*** S.V.Chekalin, *Inst. of Spectroscopy, Russia,* A.P.Yartsev, V.Sundström, *Lund Univ., Sweden.* Charge carriers generation was investigated in C_{60} films excited by 100 fs laser pulses and probing in the spectral range of 400–1100 nm. Data were compared on excitation in fundamental bands of C_{60} and in forbidden HOMO–LUMO band. In all cases carriers arises during excitation pulse.		

16:00–16:30 COFFEE BREAK

Hall 1

16:30–18:15
FK • Seminar on Nonlinear Materials III
A.A.Kaminskii, *Inst. of Crystallography, RAS, Russia, Presider*

16:30
FK1 (Invited) • Strong optical nonlinearities of absorbing nematic liquid crystals, M.I.Barnik, *Inst. of Crystallography, Russia,* V.F.Kitaeva, A.S.Zolot'ko, *Lebedev Phys. Inst., Russia.* The review of the current state of the experimental and theoretical studies of the orientational nonlinearity of absorbing nematic liquid crystals and related light-wave-propagation phenomena are presented. The mechanism of collective reorientation of molecules, arisen from the variation in the noncentral potential of intermolecular interaction, is considered.

17:00
FK2 (Invited) • Temperature noncritical interactions in biaxial optical crystals, V.G.Dmitriev, *RDI "Polus", Russia,* S.G. Grechin, *Bauman MSTU, Russia,* V.A.D'yakov, V.I.Pryalkin, *Moscow State Univ., Russia.* Results of theoretical and experimental investigations of temperature-noncritical birefringence and nonlinear frequency conversion in biaxial optical crystals are presented. An essential role of homogeneous temperature induced strains is demonstrated. The possibility of the occurrence of temperature-independent second and high order interactions is shown.

Hall 2

16:30–18:45
FL • Nonlinear Optical Phenomena V
G.Stegeman, *CREOL, Univ. of Central Florida, USA, Presider*

16:30
FL1 (Invited) • Solitary waves with different phase behavior at stimulated Raman scattering in regimes of generation and amplification, A.S.Grabtchikov, P.A.Apanasevich, V.A.Orlovich, *Stepanov Inst. of Phys., Belarus.* We present results of investigation proving an existence of three types of solitary waves at stimulated Raman scattering in hydrogen. We demonstrate that these solitary waves can be generated spontaneously and deterministically.

17:00
FL2 (Invited) • Effect of discreteness of laser action and condensed medium response on the nonlinear and photophysical phenomena, M.N.Libenson, *S.I.Vavilov State Optical Inst., Russia.* It is shown the role of discreteness of solids in a structure of near field of irradiated surface, in action of super short laser pulses, jump of absorption for metals, in quite difference of results of laser ablation by continuous and pulse-periodical laser radiation.

Hall 3

16:30–18:45
FM• Ultrafast Phenomena III
M.S.Pschenichnikov, *Univ. of Groningen, the Netherlands, Presider*

16:30
FM1 (Invited) • Ultrashort x-ray sources: Theory and experimental aspects, Th.Brabec, *Techn. Univ. Wien, Austria.* We will discuss theory and experimental aspects of various laser based ultrashort x-ray radiation sources, with emphasis on attosecond pulse physics with high harmonic radiation sources.

17:00
FM2 (Invited) • Ultrafast dynamics of InAs/GaAs quantum dot lasers, C.Lingk, J.Zimmermann, G.von Plessen, J.Feldmann, S.T.Cundiff, M.Arzberger, G.Böhm, G.Abstreiter, *Ludwig-Maximilians-Univ., Germany.* The ultrafast lasing dynamics of electrically and optically pumped quantum dot lasers is investigated. Mode beating and dark pulse formation are found and reflect the inhomogeneous distribution of quantum dot levels.

Hall 4

16:30–18:15
FN • Quantum and Atomic Optics V
S.Ya.Kilin, *Stepanov Inst. of Physics, NASB, Belarus, Presider*

16:30
FN1 (Invited) • Atomic coherence effects: solids versus gases, O.Kocharovskaya, *Inst. of Appl. Phys., Russia, Texas A&M Univ., USA.* We overview a number of novel coherent effects: laser control of nuclear transitions, stopping of the light, inversionless lasing with self-generated driving field, etc., emphasizing advantages of solids over gases for applications of these effects.

17:00
FN2 (Invited) • Scalable quantum computing with quantum optical systems, T.Calarco, D.Jaksch, J.I.Cirac, P.Zoller, *Univ. of Innsbruck, Austria.* We present quantum optical systems that implement quantum computing tasks concentrating on two-qubit gates. We investigate different schemes, based on (i) collisional interactions between neutral atoms and (ii) conditional Coulomb interactions between ions in arrays of micro-traps.

Hall 5

16:30–18:30
FO • Nonlinear Dynamics of Optical systems III
N.N.Rosanov, *Inst. for Laser Physics, St. Petersburg, Russia, Presider*

16:30
FO1 (Invited) • Polarized patterns in a broad-area VCSEL, N.Loiko, I.Babushkin, *Stepanov Inst. of Phys., Belarus.* Theoretical modeling of an extended nonlinear pattern formation in a VCSEL is presented. Influence on the transverse mode selection of the gain, material anisotropies, Bragg reflectors, applied magnetic field and other effects are considered.

17:00
FO2 (Invited) • Excitability in semiconductor laser systems, S.Barland, P.Coullet, M.Giudici, J.R.Tredicce, *Univ. de Nice-Sophia Antipolis, France,* S.Balle, *Univ. de las Islas Baleares, Spain.* We review the concept of excitability and we experimentally show that several optical systems are able to display an excitable behavior. We analyze their properties and we show experimental evidence of the coherent resonance effect.

Hall 1

FK • Seminar on Nonlinear Materials III (Continued)

17:30
FK3 • A novel family of semiorganic NLO materials based on glycine, M.N.Bhat, M.Shashidar M, S.M.Dharmaprakash, *Mangalore Univ., India.* New compounds are prepared by including various inorganic salts in glycine. They were found to generate optical SH radiation when exposed to Nd:YAG laser. It was observed that the inclusion of the inorganic salt converts the centrosymmetric glycine into noncentrosymmetric structure. The SH conversion efficiency of the new materials are greater than that of KDP and are promising materials for NLO applications.

17:45
FK4 • Optical nonlinearities of thin mesoporous titanium dioxide films, V.Gayvoronsky, M.Brodyn, O.Loginenko, *Inst.of Phys., Ukraine,* Th.Dittrich, V.Duzhko, *Tech. Univ. of Munich, Germany,* V.Timoshenko, *Moscow State Univ., Russia.*

Hall 2

FL • Nonlinear Optical Phenomena V (Continued)

17:30
FL3 (Invited) • Quasi-phase-matched three-frequency wave interactions in active-nonlinear periodically poled lithium niobate, G.D.Laptev, *Moscow State Univ., Russia.* The results of the study of intracavity quasi-phase-matched three-frequency wave interactions (self-frequency doubling and halving, self-parametric amplification at low frequency pumping, frequency mixing using pump wave) in active-nonlinear periodically poled Czochralski-grown Nd:Mg:$LiNbO_3$ crystal is represented.

Hall 3

FM• Ultrafast Phenomena III (Continued)

17:30
FM3 (Invited) • Cr_2+:ZnSe laser crystal for femtosecond pulse generation, V.G.Shcherbitsky, N.V.Kuleshov, *Int. Laser Center, Belarus,* V.I.Levchenko, V.N.Yakimovich, *Inst. of Solid State and Semicond. Phys., Belarus,* M.Mond, A.Diening, E.Heumann, H.Kretschmann, S.Kück, G.Huber, *Univ. Hamburg, Germany.* Direct continuous wave diode-pumping of Cr_2+:ZnSe single crystals was realized. An output power of 15.4 mW and slope efficiency of 14.2% were demonstrated. Efficient laser operation Cr:ZnSe laser was obtained with output power of 1.4 W under Tm:YAG laser pumping.

Hall 4

FN • Quantum and Atomic Optics V (Continued)

17:30
FN3 • Effects of inhomogeneous line broadening on electromagnetically induced transparency (EIT) and slow group velocity, E.Kuznetsova, O.Kocharovskaya, *Inst. of Appl. Phys., Russia, Texas A&M Univ., USA,* M.O.Scully, *Texas A&M Univ., USA.* We study the influence of inhomogeneous line broadening on EIT and slowing of light. We show that inhomogeneous broadening can lead to narrowing of EIT line and slowing of the group velocity.

17:45
FN4 (Invited) • Coherent information: a key to information analysis of quantum systems, B.A.Grishanin, V.N.Zadkov, *Moscow State Univ., Russia.* The coherent information concept is used for quantum information analysis of a number of quantum systems. It is shown that it can serve as an appropriate tool for characterization of quantum information stored in quantum systems relevant to the modern experiments with quantum information.

Hall 5

FO • Nonlinear Dynamics of Optical systems III (Continued)

17:30
FO3 • Intensity noise in semiconductor lasers coupled to fiber Bragg grating, P.Besnard, *ENSSAT, Lab. d'Optronique, France,* A.Naumenko, N.Loiko, *Stepanov Inst. of Phys., Belarus,* G.Ughetto, J.C.Bertreux, *Acatel Optronics, France.* Stationary characteristics and relative intensity noise are simulated for a laser diode with strong optical feedback from external Bragg reflector. Multiple reflections in external cavity are taken into account. Numerical results are copared with analytical expressions and experimental results.

17:45
FO4 (Invited) • Spatial and temporal structures of light fields in nonlinear interferometer, O.G.Romanov, A.S.Rubanov, A.L.Tolstik, *Belarusian State Univ., Belarus.* Investigation of nonlinear interferometers symmetrically pumped by two light beams has been proposed. An analysis of the conditions for realization of symmetrical and asymmetrical optical bistability, different spatial-temporal structures due to symmetry breaking bifurcation has been performed.

Hall 1	Hall 2	Hall 3	Hall 4	Hall 5
FK • Seminar on Nonlinear Materials III (Continued)	**FL • Nonlinear Optical Phenomena V (Continued)**	**FM• Ultrafast Phenomena III (Continued)**	**FN • Quantum and Atomic Optics V (Continued)**	**FO • Nonlinear Dynamics of Optical systems III (Continued)**
18:00 ***FK5 • Modification of the non-linear optical, dielectric and structural properties of p-Nitroaniline and 2-Methyl-4-nitroaniline crystals through re-crystallization under a strong dc electric field,*** E.de Matos Gomes, E.Nogueira, S.Lanceros-Mendez, *Univ. do Minho, Portugal,* M.Margarida, R.Costa, *Univ. de Coimbra, Portugal,* A.Criado, *Univ. de Sevilla, Spain.* We report a novel way of modifying the non-linear optical properties of organic crystals through re-crystallization under an intense dc electric field. The observed modification in physical properties will be presented and discussed in detail.	*18:00* ***FL4 • Periodically poled lithium niobate optical parametric oscillator pumped by a diode-pumped, Q-switched Nd:YAG laser,*** O.Balachninaite, R.Grigonis, V.Sirutkaitis, *Vilnius Univ., Lithuania,* R.C. Eckardt, *Cleveland Crystals, Inc., USA.* We report the optimization of a periodically poled lithium niobate (PPLN) optical parametric oscillator (OPO) pumped by a diode-pumped, Q-switched Nd:YAG laser operated at 1064 nm. Total conversion efficiency exceeding 52 % was achieved.	*18:00* ***FM4 • Spectral characteristics of ultrashort pulses in Kerr-lens mode-locked lasers,*** V.L.Kalashnikov, *Int. Laser Center, Belarus,* E.Sorokin, I.T.Sorokina, *Inst. for Photonics, Austria.* The numerical simulations in the combination with experiment demonstrate that the stimulated Raman scattering and the gain saturation in the presence of reabsorption in active medium are the causes of the ultrashort pulse self-frequency shift observed in Cr:LiSGaF and Cr:LiSAF lasers.		
	18:15 ***FL5 • Red OPO based on the periodically poled KTP,*** V.Pasiskevicius, J.A.Tellefsen, F.Laurell H.Karlsson, *Royal Inst. of Technology, Sweden,* R.Butkus, V.Smilgevicius, A.Piskarskas, *Vilnius Univ., Lithuania.* The experimental results of the investigation of the OPO based on the periodically poled KTP crystal pumped by the second harmonic of the Q-switched Nd:YAG laser are presented. Narrow-linewidth optical pulses at wavelengths around 630 nm with energy 2.2 mJ were generated with 61% efficiency.	*18:15* ***FM5 • Comparative analysis of second harmonic generation in large aperture crystals with multi-terawatt femtosecond Ti:Sa chirped-pulse amplification laser radiation in crystals,*** I.A. Begishev, M.P.Kalashnikov, V.Karpov, H.Schönnagel, P.V.Nickles, *Max-Born-Inst. für Nichtlineare Optik und Kurzzeitspektroskopie, Germany,* I.A.Kulagin, U.K.Sapaev, T.Usmanov, *NPO "Akadempribor", Uzbekistan.*		*18:15* ***FO5 • Polarization transverse pattern dynamics in lasers: investigation of the patterns produced using the stereographic projection of the Poincare sphere on the complex plane and their singular points,*** I.V.Veshneva, L.A.Melnikov, *Saratov State Univ., Russia,* A.I.Konukhov, *Saratov Div. of the Inst. of Radio-Engi. and Electronics, Russia.* Dynamics of Zeeman laser with large Fresnel number and anisotropic cavity was simulated. For the analysis of transverse polarization structure of vectorial Karhunen-Loewe modes the singular points (vector defects) of special mapping were used.
	18:30 ***FL6 • The properties of fast-axial turbulent flow of laser mixture with light-induced heat releasing,*** M.G.Galuskin, V.S.Golubev, V.Ya.Panchenko, Yu.N. Zavalov, V.D.Dubrov, S.A. Buyarov, R.V. Grishayev, *Inst. on Laser and Information Technologies, RAS, Russia.* Fluctuations of phase incursion of probe laser beam in turbulent flow of active medium of cw CO_2 laser with fast axial flow were determined. Dependence of coefficient of mutual correlation of phase incursion on intensity of high power laser beam was found.	*18:30* ***FM6 • Tracing the frequency of a single light pulse by SHG and self-diffraction autocorrelators,*** V.Kabelka, *Inst. of Phys., Lithuania,* A.V. Masalov, *Lebedev Physical Inst., Russia.* Two femtosecond pulses characterization methods based on second harmonic generation (SHG) and self-diffraction (SD) are presented. Both techniques can produce a two-dimensional image of the frequency versus time without using any spectral apparatus.		

18:30–20:00 Poster Sessions (in the foyers of the Halls 1,2, and 3 at the 3rd floor)

FP • Seminar on Nonlinear Materials

FP1 • Nonlinear optical properties of colloidal metals, A.I.Ryasnyansky, M.K. Kodirov, *Samarkand State Univ., Uzbekistan,* R.A.Ganeev, I.A.Kulagin, T.Usmanov, *NPO Akadempribor, Uzbekistan.* In this paper, the nonlinear optical parameters of colloidal solutions of various metals (silver, gold, copper and platinum) using Z-scan method and third harmonic generation were investigated.

FP2 • Nonlinear susceptibilities of fullerenes, I.Ryasnyansky, M.K.Kodirov, *Samarkand State Univ., Uzbekistan,* R.A.Ganeev, I.A.Kulagin, T.Usmanov, *NPO Akadempribor, Uzbekistan.* In this paper, the nonlinear-optical parameters of C_{60} and C_{70} in toluene solutions and polyimide films are investigated using Z-scan method and third harmonic generation (THG) on the wavelength of Nd:YAG laser radiation (λ = 1,064 nm, t = 35 ps).

FP3 • Photorefractive and photovoltaic contributions to forming optical distortions in $LiNbO_3$, V.V. Grishachev, *Moscow State Univ., Russia.* By method of second harmonic generation (SHG) is explored photorefractive and photovoltaic effects in pure $LiNbO_3$. Type of SHG kinetics depends on dominating effect. Photorefractive effect gives basic contribution in case phase mismatches generation

FP4 • The origin of near ultraviolet absorption of nonlinear BBO crystals, V.D.Antsygin, O.Yu.Dashevsky, V.P.Solntsev, R.I.Mashkovtsev, E.G.Tsvetkov, *Inst. of Automation and Electrometry, Russia.* The absorption, luminescence, thermoluminescence, and EPR of BBO crystals grown using a stoichiometric melt or Na_2O, NaF and PbO as the solvent have been investigated. Additional UV absorption is caused by impurities (Pb, Na) and defects.

FP5 • Experimental estimation of the uniform internal electric field and photoconductivity inside the $Ba_{0.7}$-$Ca_{0.23}TiO_3$ crystal (BCT), V.Matusevich, A.Kiessling, R.Kowarschik, *Friedrich Schiller Univ. Jena, Germany.* We have developed an experimental method for estimation of the value of the uniform internal effective electric field inside the BCT crystal. This method is based on the results of two- and four-wave mixings and by easy mathematical transformations yields the value of photoconductivity as well.

FP6 • Nonlinear optical properties of fullerene-doped π-conjugate organic materials based on polyimide and COANP structures, N.V.Kamanina, V.N. Sizov, D.I.Stasel'ko, *Vavilov State Optical Inst., Russia.* Nonlinear optical properties of fullerene-doped π-conjugated organic systems have been studied. Using the dynamic hologram technique the drastic change of refractive index has been observed and the nonlinear coefficients n_2 and $\chi^{(3)}$ have been estimated.

FP7 • Features of nonlinear conversion of thermal radiation in a lithium crystal formate, N.A.Deinekina, I.A.Korosteleva, *Far-Eastern State Transport Univ., Russia.* The basic differences are found out during conversion of wide infrared spectrum of frequencies in lithium formate crystals in comparison with other crystals of an mm2 class consisting available of a limiting corner of synchronism and rotation of curves collinear of synchronism.

FP8 • Observation of optical nonlinearity size enhancement in one-dimensional molecular aggregates, R.V.Markov, A.I.Plekhanov, *Inst. of Automation and Electrometry, Russia,* V.V.Shelkovnikov, *Novosibirsk Inst. of Organic Chemistry, Russia.* Thin films of pseudoisocyanine molecular aggregates possessed a giant optical nonlinearity were obtained. Exciton delocalization length was calculated from absorption line width. Predicted size enhancement of the nonlinear optical properties for molecular aggregates was observed.

FP9 • Nonlinear optical study of barium hexaferrite single crystals, A.A.Rzhevsky, V.V.Petrov, R.V.Pisarev, *Ioffe Phys. Tech. Inst., Russia,* A.Kirilyuk, Th.Rasing, *Res. Inst. for Materials, The Netherlands.* Second harmonic generation (SHG) in barium hexaferrite single crystals has been investigated at λ=0.8 μm. The crystallographic and magnetic contributions to the SHG are analyzed. The analysis has shown that in reality the surface symmetry of hexaferrites is lower than its assumed point group 6/mmm.

FP10 • Spectroscopic investigations of chromium doped $KTiOPO_4$ single crystal, E.V.Pestryakov, V.V.Petrov, A.G.Volkov, *Inst. of Laser Phys Russia,* V.A.Maslov, *General Phys. Inst. Russia.* The possibility of creation of self-frequency doubling laser crystal based on crystal KTP ($KTiOPO_4$) doped with chromium ions is investigated. The spectroscopic data and the main laser parameters of KTP:Cr^{3+} crystals are performed.

FP11 • Photorefractive response of a cubic gyrotropic crystal with Appl. square-wave electric field on the interference grating with large contrast, R.V.Litvinov, *State Univ. of Control Syst. and Radioelect., Russia.* Nonlinear transformation of spatial specter of photorefractive field in BTO crystal is considered for case when the space charge field and interference light structure consisting of three spatial harmonicas are the self-consistent.

FP12 • KDP domain structure properties near the phase transition point, A.A.Zhukov, P.A.Prudkovskii, *Moscow State Univ., Russia.* The mathematical one-dimension model of the domain structure near phase transition in the ferroelectric KDP-type crystals was built. Validity of this model for description of the incommensurate phase and fractal domain structures was analyzed.

FP13 • Absorptance measurement of nonlinear crystals by calorimetric method, O.Balachninaite, M.Barkauskas, R.Grigonis, M.Maciulevicius, A.Melninkaitis, V.Sirutkaitis, *Vilnius Univ., Lithuania.* We report the measurements of absorptance of some crystals for different polarizations performed according to the ISO11551 standard by pulse calorimetric method at 1064 nm using pulsed diode-pumped Q-switched YAG:Nd laser.

FP14 • Photorefraction in novel polymer compositions, I.V.Yurasova, O.L.Antipov, *Inst. of Appl. Phys., Russia,* W.E.Douglas, *Univ. Montpellier II, France,* L.G.Klapshina, V.V.Semenov, G.A.Domrachev, T.I.Lopatina, *Inst. of Metallo-organic Chem., Russia.* Novel photorefractive polymer compositions based on fullerene charge-generator, photoconductor, and optical chromophore are designed and investigated. Two-wave and four-wave mixings, z-scan technique as well as electro-optical and spectroscopic measurements have been used to study the origin of nonlinearity, the magnitude of changes in refractive index, and its temporal behavior.

FP15 • Er^{3+} to glass matrix energy transfer in Ga-Ge-S:Er^{3+} system, T.Yu.Ivanova, A.A.Man'shina, A.V.Kurochkin, Yu.S.Tver'yanovich, *St.-Petersburg State Univ., Russia.* Spectroscopic properties of Er^{3+} in Ga_2S_3-GeS_2-Er_2S_3 glass are investigated. Estimation of nonradiative relaxation rate demonstrate the occurrence of energy transfer from Er^{3+} ion to glass matrix. An idea of the practical use of this nonradiative energy transfer is suggested.

FP16 • Infrared optical and magnetooptical spectra of (CoFeZr)SiO films with tunnel magnetoresistance, I.Bykov, *Vernadsky Inst. of Geochem. and Analytical Chem., Russia,* A.Bogoroditsky, E.Gan'shina, A.Granovsky, V.Guschin, Yu.Kalinin, O.Stogney, A.Yurasov, *Moscow State Univ., Russia,* A.Kozlov, *Astrakhan Univ., Russia.* It was found that in metal-dielectric granular films $(Co_{49}Fe_{44}Zr_7)_x(SiO_n)_{100-x}$ oscillations of reflectivity index and the magneto-refractive effect (MRE) are observed. MRE is nonlinear in magnetization and reach the saturation value of 0.3% in far IR region.

FP17 • Light-induced director reorientation in nematic liquid crystal under femtosecond pulses, A.A.Goncharov, I.A.Ozheredov, A.P.Shkurinov, *Moscow State Univ., Russia,* V.F.Kitaeva, A.S.Zolot'ko, *Lebedev Phys. Inst., Russia.* The interaction of a nematic liquid crystal (NLC) with the succession of the femtosecond pulses is investigated. The NLC optical response to the pulses was found to be of orientational origin and to equal that in the field of the continuous wave of the same average power. The results are indicative of no appreciable effect of the flow and photoelastic stresses on the light-induced director reorientation.

FP18 • Intracavity quasi-phase-matched self-frequency conversions in periodically poled Nd:Mg:$LiNbO_3$, G.D.Laptev, A.A.Novikov, I.I.Naumova, *Moscow State Univ., Russia.* The theory of quasi-phase-matched self-frequency conversion of light waves in active-nonlinear periodically poled Nd:Mg:$LiNbO_3$ crystal located in double resonant cavity is presented in this paper. Quasi-phase-matched second harmonic generation by self-frequency doubling of fundamental radiation has been observed experimentally.

FP19 • Photodynamics of optical limiting of power laser radiation, I.M.Belousova, V.P.Belousov, O.B.Danilov, V.V.Danilov, A.I.Sidorov, I.L.Yachnev, *Res. Inst. for Laser Phys., Russia.* We present the results of studies on creation of nonlinear-optical limiters of laser radiation based on different principles and materials, including fullerene-containing media, liquid crystals, semiconductors, and gases, operating in wide spectral range from 0.3 to 12 μm for protection of optical systems, sensors, and eyes.

FP20 • Low intensity optical nonlinearity in thin films below the band edge, A.V.Khomchenko, *Inst. of Appl. Optics, Belarus.* The optical nonlinearity in the semiconductor and dielectric thin films structures is studied at a wavelength of 630 nm in a range of light intensities below 0.1 W/cm^2 by waveguide methods. The nonlinear optical constant was found to be 10^{-3} cm^2/W. An origin of the photoinduced change in optical properties of the thin films is speculated as modification of surface states in the band gap. It's shown a possibility of controlling light in the self-effect case.

FP21 • Photophysical and second-order nonlinear properties of push-pull fluorinated 4-(dicyanomethylene)-pyranes, S.L.Bondarev, V.N.Knyukshto, S.A.Tikhomirov, I.I.Kalosha, *Inst. of Mol. and Atomic Phys., Belarus,* V.I.Tyvorskii, D.N.Bobrov, N.M.Nevar, O.G.Kulinkovich, I.Ledoux, *France Telecom, France.* The steady-state and timi-resolved spectroscopic studies with second-order polarizability measurements of new synthesized nonlinear materials on the base of 4-(dicyanomethilene)-pyranes are reported. An influence of sructural and enviroment characteristics on the photophysical and nonlinear properties of investigated compounds will be discussed.

FP22 • Nonlinear absorption properties of new cobalt-doped transparent glass ceramics, A.M.Malyarevich, I.A.Denisov, K.V.Yumashev, *Int. Laser Center, Belarus,* O.S.Dymshits, A.A.Zhilin, *Vavilov State Optical Inst., Russia.* Absorption saturation at 1.54 μm as well as stimulated emission and excited state absorption of the transparent magnesium-aluminum glass ceramics containing tetrahedrally coordinated Co^{2+} ions in dependence on the synthesis conditions and Co ions concentration were studied.

FP23 • Optical properties of $LiInS_2$ nonlinear crystal, Yu.M.Andreev, L.G. Geiko, P.P.Geiko, *Inst. of Optical Monitoring, Russia,* S.G.Grechin, *Bauman MSTU, Russia.* Results of investigation of a non-linear optical properties, threshold damage for $LiInS_2$ monocrystal are reported. Results of computation for phase-matching properties of different frequency conversion problems are represented. Possibility the group-velocity matching in phase-matching direction in crystal transmission band for SFG and DFG is represented.

FP24 • Optical properties of Co-containing epitaxial garnet films, V.V.Randoshkin, N.N.Sysoev, N.V.Vasilyeva, Moscow State Univ., Russia, V.G.Plotnichenko, Yu.N.Pyrkov, General Phys. Inst. Russia. The $Gd_3(Ga,Co)_5O_{12}$ and $Gd_3(Ga,Co,Ge)_5O_{12}$ films were grown on (111)-oriented $Gd_3Ga_5O_{12}$ substrates from the $PbO–B_2O_3$ based flux. The optical absorption of the Co-containing films is investigated in 0.2–2.0 μm wavelengths range.

FP25 • Spectroscopy and population dynamics of monoclinic crystals $KY(WO_4)_2$:1÷15% Tm pumped by a free-running Nd:YAG laser, S.N.Bagayev, S.M.Vatnik, A.P.Majorov, *Inst. of Laser Phys. Russia,* A.A.Pavlujk, *Inst. of Inorganic Chem., Russia.* Spectroscopy, population dynamics and laser operation of $KY(WO_4)_2$:1–15%Tm have been studied under free-running Nd:YAG laser pumping. Under longitudinal pump of 1064nm the unstable laser operation has been demonstrated over spectral range 1850 to 1950nm. The blue emission corresponding to transitions $^1G_4 \rightarrow {}^3H_6$ has been observed for all Tm concentrations. Concentration dependencies of cross-relaxation efficiency as well as lifetimes of $^3H_4$ and $^1G_4$ manifolds are discussed also.

FP26 • Excited state absorption and population of higher-lying levels of Nd^{3+} ions under diode and laser pumping of Nd:YAG crystals, O.L.Antipov, O.N.Eremeykin, V.A.Vorob'ev, Inst. of Appl. Phys., Russia, O.S.Morozov, A.P.Savikin, *Nizhnii Novgorod State Univ., Russia.* The population of the metastable higher-lying level $^2F(2)_{5/2}$ of the 4f electron shell of Nd^{3+} ions due to multi-step transitions in a Nd:YAG crystal under diode and laser pumping is studied by visible-UV luminescence spectroscopy. Excited state transitions from the level $^4F_{3/2}$ in the cw-diode-pumped Nd:YAG crystal were induced by pulsed laser beams with different wavelengths.

FP27 • Long-lived nonlinear refraction of diamonds with different impurities content induced by UV radiation, V.V.Filippov, Firsov S.P., E.V.Ivakin, N.M.Lapchuk, *Stepanov Inst. of Phys., Belarus,* A.V.Sukhodolov, *Belarusian State Univ., Belarus.* It has been shown that long-lived nonlinear refraction is natural and synthetic diamonds by UV pulsed radiation with lifetime, amplitude and temperature behavior dependent on sample's defect content. A correlation between heat conductivity and normalized amplitude of light induced refractive index change has been revealed.

FQ • Strong Laser Fields and High Filed Physics

FQ1 • Stabilization of the three-dimensional quantum system with a short-range potential, A.M.Popov, O.V. Tikhonova, E.A.Volkova, *Moscow State Univ., Russia.* Laser-induced photoionization of the 3D model system with a short-range potential is investigated by means of direct numerical integration of the non-stationary Schroedinger equation. The strong-field stabilization regime is established for different values of the laser frequency. The results are interpreted in terms of both non-perturbative atomic states and the Kramers-Henneberger states.

FQ2 • Strong increasing the efficiency of high-order harmonic generation using counter-propagating laser pulses, I.P.Prokopovich, A.A.Khrutchinsky, D.Yu. Churmakov, *Belarusian State Univ., Belarus,* J.Peatross, *Brigham Young Univ., USA,* A.A.Apolonsky, *Vienna Univ. of Technology, Austria.* We present results of computer simulation showing increases in the production and intensity of high-order harmonics in rare gas interacting with counter-propagating pulses. This is least by two orders of magnitude more than obtained with other methods.

FQ3 • The damage process of aluminum crystal surfase by a powerful ultrashort laser pulse, V.V.Besogonov, V.G.Chudinov, *Inst. of Appl. Mech., Russia.* The damage process of crystal aluminum surface by powerful pulse beams of laser radiation has been investigated with the help of the molecular dynamics method. A direct transformation of beam energy into energy of mechanical atomic motion is shown to be possible owing to a change of the Coulomb interaction screening in an ionic subsystem upon excitation of valence electrons.

FQ4 • Tunnel above-threshold ionization of multicharge ions: photoelectron relativistic distributions and effect of gradient stabilization, R.V.Kulyagin, V.D.Taranukhin, *Moscow State Univ., Russia.* Spatial distributions of photoelectrons in process of multielectron atom ionization by relativistic radiation are investigated. It is shown that gradient forces on trailing edge of the pump pulse can compensate the relativistic drift of photoelectrons.

FQ5 • New approach to laser electron acceleration, A.Bahari, I.V.Ivanov, I.A.Kudinov, V.D.Taranukhin, *Moscow State Univ., Russia.* It is shown that in super-strong electromagnetic field the ponderomotive forces are not potential and depend on the field polarization. A new technique for charge acceleration with high-intensity two-polarized laser beams is proposed and investigated.

FQ6 • Resonance excitation of Langmuir waves in the course of tunnel ionization of gas by short laser pulse, V.B.Gildenburg, N.V.Vvedenskii, *Inst. of Appl. Phys., Russia.* Generation of Langmuir waves at the nonlinear stage of the plasma-resonance ionization instability developing in the high intensity laser fields is studied. The spatiotemporal evolution of the laser pulses and pulse-created plasma are calculated.

FQ7 • On the angular distributions of the fragments of Coulomb explosion of diatomic molecules in the strong field, V.V.Gridchin, A.M.Popov, O.V.Smirnova, *Moscow State Univ., Russia.* The picture of the angular distributions of the fragments of Coulomb explosion of heteronuclear diatomic molecules in a strong laser field of linear polarization is shown to be strongly dependent on the field parameters. Coulomb explosion of the nuclear subsystem of HD is studied on the basis of the classical model. Two sufficiently different regimes of the nuclear dynamics are established. The boundaries of the regimes are defined.

FQ8 • Fusion neutrons production in D-enriched modified solid targets using moderate intensity femtosecond pulses, D.M.Golishnikov, V.M.Gordienko, A.B. Savel'ev, R.V.Volkov, *Moscow State Univ., Russia,* V.D.Sevastianov, *Res. Inst. of Phys., Tech. and Radio Engin. Measur., Russia.* We report experimental observation of neutrons released from $d(d,n)^3He$ fusion reaction, taking place in plasma created by subpicosecond laser pulse with moderate intensities (10^{16} W/cm^2) on the modified surface of solid-state deuterium enriched Ti targets.

FQ9 • X-rays and hot particles generation in laser-induced plasma created on the surface of solid laser-modified targets, R.V.Volkov, O.V.Chutko, M.S. Dzhidzhoev, D.M.Golishnikov, V.M.Gordienko, P.M.Mikheev, A.B.Savel'ev, *Moscow State Univ., Russia.* The results of experiments on interaction of 200 fs, $2 \cdot 10^{16}$ W/cm^2 laser pulse with laser-modified solid targets are reported. The soft and hard X-ray yield, temperatures of hot electrons and fast ions are measured.

FQ10 • Internal electronic conversion decay of low-energy nuclear levels excited in hot dense femtosecond laser plasma, O.V.Chutko, V.M.Gordienko, I.M.Lachko, P.M.Mikheev, A.A.Rusanov, A.B.Savel'ev, *Moscow State Univ., Russia.* The methods of detection of nuclear excitations in hot dense laser plasma, based on properties of internal electronic conversion, are proposed. The important role of dynamics of plasma charge state in residual gas is shown.

FQ11 • Local field amplification in femtosecond laser plasma formed on a modified surface of the target, P.M.Mikheev, V.M.Gordienko, A.B.Savel'ev, *Moscow State Univ., Russia.* Optimal parameters of modified surface targets (silicon, aluminium gratings and carbon foam) for increase of local electromagnetic field amplitude in plasma, created at laser intensity of 10^{15}–10^{16} W/cm^2 was found.

FQ12 • Off-axial phase-matched high-order harmonic generation in extended medium under self-guiding of laser beam, V.T.Platonenko, V.V.Strelkov, *Moscow Sate Univ., Russia,* G.Ferrante, *Univ. of Palermo, Italy.* High-order harmonic generation efficiency can be essentially increased due to off-axially phase-matching. For harmonic generation by self-channeled laser pulse we obtain in calculations conversion efficiencies about 10^{-3} for 33-rd harmonic and 10^{-4} for 121-st one.

FQ13 • Nuclear excitation by X-ray emission and hot electrons of femtosecond laser plasma, A.V.Andreev, R.A.Chalykh, *Moscow State Univ., Russia.* The paper is devoted to the theoretical analysis of nuclear excitation in laser plasma produced by femtosecond laser pulse with intensity 10^{15}-10^{16} W/cm^2 on the surface of the solid target. Dynamics of electronic component of the plasma is analyzed by using kinetic equation in approximation of anomalous skin effect.

FQ14 • About the radiation at $n\omega_p$ from overdense plasma layers, O.P.Polyakov, P.A.Polyakov, *Moscow State Univ., Russia.* In the present work are obtained the new generation mechanism of higher plasma harmonics in a plasma layer near the plasma–vacuum bound. Those harmonics caused by a powerful femtosecond laser pulse interaction at the overdense plasma.

FR • Ultrafast Phenomena

FR1 • Ultra-fast cooling of electronic subsystem in ultra-thin metal films, V.M.Petnikova, K.V.Rudenko, V.V.Shuvalov, *Moscow State Univ., Russia.* Ultra-fast cooling of electronic subsystem of ultra-thin metal film, resulting from non-elastic electronic collisions with the film surface after ultra-short laser excitation, will be considered. Experimental dasa, obtained by transient nonlinear spectroscopy of Ni films will be reported.

FR2 • Evolution of ultra-short and extremely short electromagnetic pulses in quadratic-cubic nonlinear medium, A.I.Maimistov, *Moscow Engin. Phys. Inst., Russia.* The unidirectional propagation and interactions of linearly polarized extremely short pulses in a nonlinear dispersive medium modeled by an anharmonic oscillator combining quadratic and cubic nonlinearities were considered. Two families of the steady-state pulses are found. Direct simulations demonstrate that the pulses are very robust against weak perturbations, and collide nearly elastically.

FR3 • Coherent control of dynamical tunneling in quantum wells, J.Bohórquez, A.S.Camacho B., *Univ. de los*

Andes, Colombia. The dynamical behavior of the charge in an asymmetric double quantum well is studied through the time dependent intraband dipole moment. A study of its decay as function of carrier density and well geometry is presented.

FR4 • Recording of the interference fringes structure by counterpropagating femtosecond laser pulses in the samples of porous silver containing glass and the thick slabs of dichromated gelatin, O.V.Andreeva, *Vavilov State Optical Inst., Russia,* D.A.Dement'ev, N.N.Andreev *Acoustic Inst., Russia,* S.V.Chekalin, V.O.Kompanets, Yu.A.Matveets, O.B.Serov, *Inst. of Spectroscopy, Russia,* A.M.Smolovich, *Sci. and Tech. Center of Unique Instrumentation, Russia.* The experiments were aimed at the ultrashort laser pulse wavefront forming without the temporal pulse parameters changing. The interference structure, forming the wavefront was recorded in the volume media by 50 fs pulses.

FR5 • Ultrashort light pulse scattering by 3-D interference fringe structure, M.A.Cervantes, *Univ. de Sonora, Mexico,* A.M.Smolovich, *Sci. and Tech. Center of Unique Instrumentation, Russia.* A three-dimensional interference fringe structure containing only a small number of fringes is considered. The diffraction and geometrical-optical regimes of interaction of radiation with the structure are investigated.

FR6 • Unlrashort mode locked lasers with additional Raman active elements, V.I.Trunov, A.V.Kirpichnikov, E.V.Pestryakov, V.V.Petrov, *Inst. of Laser Phys., Russia,* A.K.Komarov, K.P.Komarov, *Inst. of Automation and Electrometry, Russia.* The dynamics of ultrashort pulse formation in lasers with complex spectral gain contour and additional Raman active elements have been investigated. The stability range for single pulse and multipulse generation mode has been determinated.

FR7 • Coherent femtosecond photochemistry of radiation defects, and study of their migration in crystalline media, E.F.Martynovich, *Inst. of Laser Phys., Russia.* A new method for study of diffusion of defects in crystals was grounded. It includes the formation of a spatial profile of defects concentrations by means of coherent femtosecond photochemistry, registration and analysis of the temporal relaxation of this profile in order to determine the parameters of the initial components, intermediate and final products of photochemical reactions.

FR8 • Evolution of few-cycle light pulses in two- and three-level media: finite-difference time domain simulations, A.V.Tarasishin, S.A.Magnitskii, A.M.Zheltikov, *Moscow State Univ., Russia.* The finite-difference time-domain technique is employed to examine the evolution of the amplitude, duration, waveform, and phase of ultrashort light pulses propagating in a medium of two-level atoms or molecules.

FR9 • Investigation of relaxation times of polymethine dyes absorbing in 750–850 nm spectral range, R.Grigonis, V.Sirutkaitis, *Vilnius Univ., Lithuania,* N.A.Derevyanko, A.A.Ishchenko, *Inst. of Organic Chem., Ukraine.* The relaxation time of the first excited state of cationic symmetric polymethine dyes absorbing in spectral region 750–850 nm have been determined by a direct method of the excited-probe.

FR10 • Picosecond pulse characterization using fiber nonlinearities, R.Chari, V.Shukla, S.M.Oak, *Centre for Adv. Technology, India.* We describe the results of numerical and experimental studies of power spectra, obtained after propagation of a pulse through a single mode fiber, for getting information about the chirp and temporal shape of the incident pulse.

FR11 • Generation of high-intense individual attosecond pulses, I.P.Prokopovich, *Belarusian State Univ., Belarus.* J.Peatross, *Brigham Young Univ., USA.* The direct generation of individual high-intensity attosecond pulses by stimulated electronic Raman self-scattering of fs-pulses in ionazed rare gases is shown through numerical stimulation. The considerable advantages are shown over all methods proposed to date.

FR12 • Subpicosecond ablation ("Coulomb explosion") of metals and semiconductors heated by intense 100-fs laser pulse, S.I.Kudryashov, V.I.Emel'yanov, *Moscow State Univ., Russia.* The ultrafast (subpicosecond) ablation (Coulomb explosion) of metallic films (Al, Cu) and the self-induced metallic liquid surface layers in bulk semiconductors (Si, GaAs) heated by a 100-fs laser pulse was studied using time-resolved ellipsometry and optical microscopy.

FR13 • Stable regenerative laser amplifier on colored mμ-layer in LiF crystal with nanosecond flash lamp pumping, V.I.Baryshnikov, T.A.Kolesnikova, *Irkutsk State Univ., Russia.* Ultrashort laser pulses (<1 ps) was formed at regime of regenerative amplification in LiF crystal on 10 mμ-layer with superhigh concentration F_2 color centers at pumping by nanosecond flashes of powerful Xe-lamp.

FR14 • From two-beam surface plasmon interaction to femtosecond surface optics and spectroscopy, M.M.Nazarov, A.P.Shkurinov, *Moscow State Univ., Russia,* Yu.E.Lozovik, *Inst. of Spectroscopy, Russia.* Degenerate three-wave mixing process with two noncollinear beams of femtosecond laser pulses on a metal grating is investigated. Sum frequency generation is concerned with the synchronized excitation of two surface plasmons and their nonlinear interaction.

FS • Novel Trends in Nonlinear Laser Spectroscopy and Optical Diagnostics

FS1 • Thermal mapping in a dry low NO_x emission methane/air burner with N_2 CARS spectroscopy, M.Marrocco, M.D'Apice, R.Cipriani, S.Giammartini, *Centro Ricerche ENEA Casaccia, Italy.* We report the results of a N_2 CARS measurement campaign aimed to realise a thermal map in the combustion chamber of a dry low NO_x emission methane/air industrial burner, actually used on GE gas turbines.

FS2 • Spectroscopy of coherent dark resonances in samarium, J.V.Vladimirova, B.A.Grishanin, V.N.Zadkov, *Moscow State Univ., Russia,* N.N.Kolachevsky, A.V.Akimov, N.A.Kiselev, S.I.Kanorsky, *Lebedev Phys. Inst., Russia.* Theoretical model of coherent population trapping phenomenon in a multilevel atom is presented. It is used for fitting experimental spectroscopic data for Sm atom and shows good agreement even in a simple four-level model, which consists of a degenerated λ-system and a fourth level, which complements the model making it an open system.

FS3 • Influence of photoinduced electronic processes on second harmonic generation at reflection from a silicon surface: transversal Dember's effect, I.M.Baranova, K.N.Evtyukhov, A.N.Muravyev, *Bryansk State Academy of Engin. and Technology, Russia.* It is shown that photostimulated electronic processes in a semiconductor influence on a reflected second harmonic generation. This influence is carried out due to tome-space transformation of a space charge region and transversal Dember's effect.

FS4 • Nonlinear optical diagnostics of hydrogen emmision process from dielectric oil, G.M.Mikheev, *Inst. of Appl. Mechanics, Russia,* Ge.M.Mikheev, A.N. Kulikov, S.F.Nikitin, *Joint-stock company "Chuvashenergo", Russia.* Hydrogen emission processes from transformer oil under the electrical breakdown and low power ultrasonic where investigated by the method of Coherent anti-Stokes Raman scattering. Diffusion coefficient of hydrogen in transformer oil was measured.

FS5 • Autler-Townes splitting of biexcitons in CuCl, P.I.Khadzhi, A.V.Corovai, D.V.Tkachenko, *Dnister State Univ. and Inst. of Appl. Phys., Moldova.* We have investigated the complex susceptibility of semiconductor for the pump-probe experimental setup, when the strong pump beam is timed ro the exciton-biexciton transition and the weak probe beam is tuned to two-photon resonance with the biexciton state to observe the two-photon absorption spectra.

FS6 • Nonlinear fluorometry of bis-cyanine dyes solutions, K.G.Blinova, A.A.Ivantsov, A.A.Ishchenko, S.V.Patsaeva, A.V.Pekhota, B.D.Ryzhikov, V.I.Yuzhakov, *Moscow State Univ., Russia.* Ethanol solutions of bis-cyanine dyes are investigated by fluorescence saturation spectroscopy. Interaction between the chromophores causes triplet state quantum yields and Stokes shifts increasing. Fluorescence saturation of the monomer dye J-aggregates is nonlinear due to bimolecular processes.

FS7 • Spectroscopy of the excited singlet states of molecular oxygen, R.J.Knize, M.P.Murdough, *US Air Force Academy, USA,* B.V.Zhdanov, D.K.Neumann, *Directed Energy Solutions, USA.* The decay rate of the molecular oxygen singlet states ($b^1\Sigma$) and ($a^1\Delta$) is directly measured as a function of oxygen pressure. A cw Titanium–Sapphire laser was used in these experiments for the direct laser excitation of the ($b^1\Sigma$) state.

FS8 • Diffusing-wave spectroscopy of nonergodic media, S.E.Skipetrov, *Moscow State Univ., Russia,* F.Scheffold, S.Romer, P.Schurtenberger, *Univ. of Fribourg, Switzerland.* Novel experimental technique is developed to perform diffusing-wave spectroscopy in nonergodic random media, where the particle motion is restricted (e.g., gels, emulsions, foams, etc.). The technique is successfully applied to colloidal gels.

FS9 • Multipeak structures in the probe-field spectrum of 4-level system, Yu.I.Belousov, D.A.Shapiro, *Inst. of Automation & Electrometry, Russia.* Narrow peaks are shown to appear in the probe-field spectrum or frequency dependence of the RFWM, intensitive both to power and Doppler broadening. The number of peaks is found for two strong fields interacting with the opposite or adjacent transitions of arbitrary 4-level system.

FS10 • Nonlinear pump-probe vectorial spectrocsopy with arbitrary polarized light, I.I.Gancheryonok, A.V.Lavrinenko, *Belarusian State Univ., Belarus,* T.Dreier, *Univ. Heidelberg, Germany.* We present the theory and new spectroscopic applications of nonlinear vectorial spectroscopy with the pump and probe beams of arbitrary polarization states and directions of propagation treated in one uniform manner. Our approach is based on covariant description of polarization of light and wave operators formalism.

FS11 • The narrowing of modulation transfer resonances in doppler broadened medium in the strong light fields, S.A.Pulkin, S.V.Uvarova, *Mendeleyev Inst. for Metrology, Russia,* T.H.Yoon, *Korea Res. Inst. of Stand. and Sci., Korea.* The signal shape in modulation transfer spectroscopy with the strong components of pump, side-band and probe waves is modeling in the frame of moving atoms in the four strong laser fields. There are the interpretation of the experimental results with narrowing less than homogeneous line width of signal shape because of multi-wave mixing processes.

FS12 • Light scattering by extraordinary polaritons in KDP and ADP crystals, T.V.Laptinskaya, A.N.Penin, *Moscow State Univ., Russia.* The anisotropy of the deformation potential and dipole moment of the KDP and ADP crystals lattice vibrations by the method of the near-

forward Raman scattering by extraordinarily polarized (anisotropic) polaritons (RSP) is investigated.

FS13 • Detection of ultralow concentration of organic compound in air, A.A.Chistyakov, D.V.Klotchkov, G.E.Kotkovskii, A.S.Nalobin, V.S.Pershenkov, E.S.Tananina, *Moscow State Engin. Phys. Inst., Russia,* V.S.Mochkin, *Sci. Inst. of Microelectr. Equipment "Progress", Russia.* The multiphoton UV laser ionization of organic molecules in air with ion registration by specially constructed ion mobility spectrometer is used to develop high sensitive organic substances trace detection (<5 ppt).

FS14 • Cavity ring-down trace gas detector based on a CW quantum cascade laser, A.L.Malinovsky, *Inst.of Spectroscopy, Russia,* A.A.Kosterev, F.K. Tittel, *Rice Univ., USA,* C.Gmachl, F.Capasso, D.L.Sivco, J.N.Baillargeon, A.L.Hutchinson, A.Y.Cho, *Bell Labs, USA.* An optical gas sensor based on the cavity ring-down spectroscopy with a CW quantum cascade laser emitting at λ=5.2 μm was realized and evaluated. A single decay event sensitivity of $2.2 \cdot 10^{-8}$ cm^{-1} was achieved that enabled NO detection at the ~15 ppb level.

FS15 • Strong-field theory of polarization sensitive spectroscopy, I.I.Gancheryonok, O.G.Romanov, A.L.Tolstik, *Belarusian State Univ., Belarus,* T.Dreier, *Univ. Heidelberg, Germany.* We report new theoretical results on polarization effects within pump-probe scheme of interaction in polarization inhomogeneous media. Our findings are applicable to explanation of experimental data on combustion diagnostics (non-interpreted until now) as well as for optimization of polarization geometry conditions under saturation regime.

FS16 • Spectral shifts and spectral switching of photon echo frequency in doped polymers, O.K.Khasanov, O.M.Fedotova, T.V.Smirnova, *Inst. of Solid State and Semicond. Phys. Belarus.* The photon echo excitation by non-collinear laser pulses in a doped polymer is investigated. The possibility of not only the blue shift of the echo frequency, but also the red one, and its spectral switching is revealed.

FS17 • Rozhdestvensky's hooks and two-photon interference, D.Yu.Korystov, S.P.Kulik, A.N.Penin, *Moscow State Univ., Russia.*

FS18 • A UV tunable diode laser source based on an external resonant cavity for OH absorption detection, G.Hancock, J.S.Gibb, G.A.D.Ritchie, *Oxford Univ., UK,* V.L.Kasyutich, *Inst. of Mol. and Atomic Phys., Belarus.* UV radiation is obtained by frequency doubling the output of a diode laser in a bow-tie cavity using a BBO crystal. This is used for absorption detection of OH radicals by resonance cavity techniques.

FS19 • Manifestation of inhomogeneous broadening of fluorescence spectra observed under pulsed laser excitation, S.Patsayeva, K.Blinova, V.Yuzhakov, *Moscow State Univ., Russia,* V.Varlamov, *Tallinn Pedagogical Univ., Estonia.* The experimental results on fluorescence saturation for dye molecules in solutions and polymer films, including organic luminophores of natural origin, are described. The manifestation of inhomogeneous spectral broadening was observed under conditions of fluorescence saturation.

FS20 • Three-dimensional microimaging of inhomogeneities in transparent media using third-harmonic generation and four-wave mixing, D.A.Akimov, S.O.Konorov, D.A.Sidorov-Biryukov, A.N. Naumov, A.B.Fedotov, A.M.Zheltikov, *Moscow State Univ., Russia.* Third-harmonic generation and four-wave mixing processes are shown to allow inhomogeneities in spatial distributions of absorption, refractive index, and nonlinear susceptibility to be imaged, thus offering a convenient method of three-dimensional microimaging.

FS21 • CO_2 Q-branches analyses by means of time-domain measurements, V.B.Morozov, A.N.Olenin, V.G.Tunkin, *Moscow State Univ., Russia.* Quite complicated picture of beats between different components of CO_2 1265 cm^{-1} and 1285 cm^{-1} Q-branches was observed by time-domain CARS. The procedure of successive approximations was used to find amplitudes distribution of Q-branches components.

FS22 • Single-mode oscillations in DFB-laser based on cholesteric liquid crystal as a method of optical diagnostics of liquid crystals, S.V.Gryshchenko, I.P.Ilchishin, *Inst. of Phys., Ukraine.* The spectra of oscillations of the DFB-laser based on dye-doped cholesteric liquid crystals (CLC) under concentracion change of the helix pitch as well as under change of the excitation intensity and quality of the planar texture was investigated. The conditions of its realizations in the wide range excitation intensity were determined.

FS23 • Nonlinear fluorimetry of organic fluorofors admixtures, I.V.Boychuk, T.A.Dolenko, V.V.Fadeev, *Moscow State Univ., Russia.* The results of computer modelling and of laboratory experiments, which demonstrate the possibility of determination of the molecular photophysical parameters of fluorofors admixtures by means of nonlinear fluorimetry with application of artificial neural networks, are presented.

FS24 • Coherent and optical methods of the diagnostics of periodic structures with the increasing of the sensitivity of measurements, A.M.Lyalikov, M.Yu.Serenko, *Grodno State Univ., Belarus.* The methods of visualization of both various defects of periodic structures and surface shape of periodic objects are considered. Experimental verification of the methods in the investigating of various transparent periodic objects is presented.

FS25 • The high sensitivity to impurity of lasing of microdroplets, A.V.Korzhov, L.G.Astafieva, L.A.Kotomtseva, G.P.Lednyeva, *Stepanov Inst. of Phys., Belarus.* High sensitivity to impurities is obtained in microcavities of aerosol laser. Influence of weak absorption of impurities on two mode steady state laser is studied. Conditions of getting two order more high sensitivity are determined.

FS26 • New aspects of polarization of amplified radiation and induced quasi-crystallinity of dye solutions, V.A.Chernyavsky, L.G.Pikulik, A.F.Grib, *Inst. of Mol. and Atomic Phys., Belarus.* The experimental researches of an optical anisotropy (the difference of refractive indexes of ordinary and extraordinary waves $n=n_o-n_e$) of dye solutions, induced by laser excitation in visible and UV-band of absorption spectrum are executed. The detected spectral regularities are explaineed in frameworks of oscillator model of a molecule.

FS27 • Nonstationary coherent light scattering in supercritical CO_2, V.N.Bagratashvili, V.M.Gordienko, V.B. Morozov, A.N.Olenin, V.K.Popov, V.G.Tunkin, D.V.Yakovlev, *Moscow State Univ., Russia.* Time-domain CARS observations of supercritical CO_2 have been fulfilled for the first time. Dephasing kinetics of of of 1388 cm^{-1} Q-branch (upper Fermi doublet $\omega_1+2\omega_2$) has been measured at critical temperature at pressures near above and below critical value.

FS28 • Spectral efficiency of new coumarin dye generation, V.Tarkovsky, S.Anufrik, *Grodno State Univ., Belarus.* Abnormal dependence generation characteristics of dyes coumarin, rhodamin and oxazine and other classes from spectral structure and duration of stimulating radation which is connected to structure of spectra excited S–S absorbtion and spectra of absorption time living products of photoexcitation is found out.

FS29 • Data processing and estimation of measurements errors in intracavity laser spectroscopy, V.S.Burakov, A.V.Isaevich, P.Ya.Misakov, V.V.Apanasovich, V.M.Lutkovski, P.V.Nazarov, *Inst. of Mol. and Atomic Phys., Belarus.* Methods of absorption spectra processing in intracavity laser spectroscopy are approved for the case of cesium water solutions. Mean-square error in the trace concentration definition was decreased to value less then 9.5%.

FT • Nonlinear Dynamics of Optical Systems

FT1 • Stochastic resonance in light emitting diodes, V.B.Pakhalov, L.S.Aslanyan, V.L.Elbakyan, *Yerevan State Univ., Armenia.* Stochastic resonance in light emitting threshold systems, such as the laser diode or light emitting nonlasing diode is registered. The power spectral density of the photocurrent contains the basic frequency and its harmonics. The signal -to- noise ratio increased approximately 10 times for the optimum value of the noise.

FT2 • Synchronization effects in a dual-wavelength CO_2 laser, B.F.Kuntsevich, *Stepanov Inst. of Phys., Belarus,* A.N.Pisarchik, *Centro de Investigaciones en Optica, Mexico.* Inphase, antiphase and lag types of synchronization have been obtained theoretically for a dual-wavelength CO_2 laser with modulated losses in one of the coupled channels. The conditions, under which the behavior of nonlinear responses in the master and slave channels is identical, have been established.

FT3 • Polarization dynamics in a microlaser with a saturable absorber, L.A.Kotomtseva, S.G.Rusov, *Stepanov Inst. of Phys., Belarus.* Results of theoretical consideration of polarization dynamics of a laser with a saturable absorber with anisotropy in active or passive element are proposed for parameters of typical solid-state micro laser with crystal saturable absorber.

FT4 • Vectorial model of nonlinear resonator, I.I.Gancherenok, O.G.Romanov, A.L.Tolstik, *Belarusian State Univ., Belarus,* B.Fleck, L.Wenke, Inst. of Appl. Optics, Friedrich Schiller Univ., Germany. The dynamics of an anisotropic plane resonator with multilevel resonant medium has been studied. The origination conditions of complex spatial-temporal polarisation dynamics have been found as well as methods of designing laser beams with special polarization structure have been suggested.

FT5 • Nonlinear dynamical phenomena in a four-frequency ring gas class-A laser with elliptically polarized eigenstates, L.P.Svirina, *Stepanov Inst. of Phys., Belarus.* Antiphase spontaneous pulsations of intensities, continuous change of instantaneous phase difference between counterrunning waves on π at transition from negative to positive tunings and jumps on 2π of mean phase differences were found in a four-frequency ring gas class-A laser.

FT6 • Asymmetric transmission of one-dimensional bandgap structures with defect; optical diode, A.G.Smirnov, *Stepanov Inst. of Phys., Belarus.* It is shown that bandgap structure with a certain defect embedded transmits light in one direction only and generates either single pulse or train of ultrashort pulses depending on intensity and duration of input light signal. A new approach to the realization of ultracompact optical diode is presented.

FT7 • Spontaneous switching between splay states in antiphase dynamics of a multimode laser, E.V.Grigorieva, *Belarusian State Univ., Belarus.* Poincare maps are analytically derived to describe antiphase oscillations in a multimode laser. On the base of such maps, a hierarchy of periodic solutions of various structures is demonstrated. Basins of initial conditions and parameters are determined for every

type of the solutions. Bifurcations leading to switching between the solutions are described.

FT8 • Asymmetrical solitons upon four-wave mixing in nonlinear interferometer, O.G.Romanov, A.S.Rubanov, A.L.Tolstik, *Belarusian State Univ., Belarus.* The theoretical and numerical modeling of localized structures formation upon four-wave mixing in nonlinear Fabry-Perot interferometer has been proposed. Stability, symmetry properties and coherent interaction of intracavity solitons have been studied.

FT9 • Short pulse LSB:$Nd^{\beta+}$ microchip laser, M.Danailov, *ISTP Laser Lab., Italy,* A.A.Demidovich, Inst. of Mol. & Atomic Phys., Belarus, A.N.Kuzmin, L.E.Batay, Stepanov Inst. of Phys., Belarus. Output characteristics of Nd:LSB/Cr:YAG microchip laser depending on the active element, passive Q-switch and cavity parameters under laser diode pumping heve been investigated. Pulse duration about 500 ps and peak power about 5 kW have been achieved.

FT10 • Regime of generation of class-B laser with nonlinear Bragg reflector, E.G.Tolkacheva, A.A.Afanas'ev, *Stepanov Inst. of Phys., Belarus.* Based on numerical simulations we show that temporal dynamics of generation of class-B laser with NBR as one of the resonator mirrors defined by the Bragg reflector nonlinearity due to space-temporal shifting of its forbidden band.

FT11 • Transient effects at dipole-dipole interactions in dense medium, A.A.Afanas'ev, *Stepanov Inst. of Phys., Belarus,* M.V.Voitikova, *Inst. of Mol. & Atomic Phys., Belarus.* On the basic of modified Bloch equations describing interaction of optical radiation with dense medium at dipole-dipole interactions and ap-conversion the transient effects and internal optical bistability effect in a field of sine and rectangular waveform impulse are investigated.

FT12 • Polarization multistability and symmetry breaking in lasers: the effect of the population dynamics, Yu.V.Loiko, A.M.Kul'minskii, A.P.Voitovich, *Inst. of Mol. & Atomic Phys., Belarus.* The effect of the population dynamics of the gain medium on polarization symmetry breaking and multistability in class-B lasers is considered. It is shown that reducing the laser symmetry leads to more predictable behavior of the laser emission.

FT13 • Modal theory and output patterns of Stokes radiation in SRS-generation at pump with Bessel light beams, V.N.Belyi, N.A.Khilo, B.B.Sevruk, V.A.Orlovich, A.S.Grabtchikov, R.V.Chulkov, *Stepanov Inst. of Phys., Belarus.* New theoretical model stimulated Raman scattering for Bessel pump beam is presented. Experimentally observed regularities in formation of angular distribution, output patterns, and diffraction-limited axial Stokes beam are explained within the framework of this model.

FT14 • Self-oscillation regimes in the ring CO_2 laser with non-planar resonator, V.M.Yasinskii, *Stepanov Inst. of Phys., Belarus.* The dynamics of oscillation of the ring CO_2 laser with the non-planar resonator was experimentally investigated. The self-oscillation regimes stipulated by interaction of four waves with orthogonal elliptic polarizations were detected and explored.

FT15 • Spatio-temporal dynamics of tapered semiconductor DFB laser incorporating a curved-grating, V.M.Volkov, *Inst. of Math., Belarus,* J.Sarma, F.Causa, *Univ. of Bath, UK,* S.I.Turovets, *Siros Technologies Inc., USA.* A novel DFB semiconductor laser configuration incorporating curved grating is numerically investigated. Enhanced spectral and spatial output characteristics have been demonstrated to be achievable in a wide range of operating conditions.

FT16 • Theory of plane wave diffraction in Fabry-Perot interferometers with built-in thin and thick gratings, A.V.Kazberuk, G.V.Sinitsyn, *Div. for Optical Problems in Inform. Technologies, Belarus.* Theoretical model of plane wave diffraction on an extended Fabry-Perot interferometer with a built-in phase sinusoidal diffraction grating based on Maxwell equations is proposed. Light fields distributions are calculated for interferometers of arbitrary thickness and possible applications are discussed.

FT17 • Dynamics and stability of long-wavelength quantum-well lasers with phase-conjugate feedback, S.V.Voitikov, V.P.Gribkovskii, *Stepanov Inst. of Phys., Belarus.* Unremovable in QW structures carrier transport affects the dynamics of lasers with a phase-conjugate feedback narrowing the stability region in about 1.5 to 2.5 times and increasing the unstable-output oscillation frequency in about 2 to 3 times.

FT18 • Transverse mode discrimination from a non-apertured Fabry-Pérot interferometer, Aït Ameur, *CIRIL/ISMRA, France.* It is shown that a device involving interferences such as a Fabry–Pérot Interferometer can discriminate the transverse modes like an apertured mirror. These discrimination properties are very sensitive with the incident beam width.

FT19 • Circular and elliptic beam shaping using simple diffractive optics, M.Fromager, K.Aït Ameur, *CIRIL/ISMRA, France.* We show that simple binary diffractive optics may transform a Gaussian beam into a dougnut beam and an elliptic beam into a circular beam. These beam manipulations are useful for trapping of particles and atoms.

FT20 • Self-Q-switching behaviour of a Cr^{3+}:LiSAF laser, M.Fromager, K. Aït Ameur, *CIRIL/ISMRA, France.* We study the influence of the direct coupling of the average lattice strains to the active ions on the behaviour of a Cr^{3+}:*LiSAF* laser which shows a self-Q-switching behaviour in certain conditions.

FT21 • Usage of fractional Talbot effect for multi-core fiber laser phase locking, D.V.Vysotsky, A.P.Napartovich, *TRINITI, Russia,* M.Wrage, P.Glas, *Max-Born-Institut fuer Nichtlineare Optik und Ultrakurzzetspektroskopie, Germany.* Periodical field multiple images reproducing after propagation through part of Talbot distance was shown analytically. The phase-locking of multi core fiber laser radiation was obtained experimentally by usage sector mirror placed at such a distance.

FT22 • Dynamic nonlinear analysis of stochastic interference fields, I.Gurov, A.Zakharov, *Inst. of Fine Mechanics and Optics, Russia.* It is proposed and investigated the recurrence nonlinear method for 2-D interference stochastic fields analysis based on the stochastic differential equations solution. Accuracy and noise-immunity of dynamic stochastic data analysis were verified experimentally.

FT23 • Transverse quasi-periodic structure of optical fields in a wide-aperture laser with frequency detuning, A.A.Kurguzkin, N.E.Molevich, *Samara State Aerospace Univ., Russia,* A.P.Zaikin, *Samara branch of Lebedev Phys. Inst., Russia.* It is investigated the instability of the wide area laser with the negative frequency detuning due to Andronov-Hopf bifurcation. The main characteristics of automodel transverse wave-profile are obtained by analytical and numerical methods.

FT24 • Chaos and synchronization of the counterpropagating waves in a solid-state ring laser with periodic pump modulation, S.N.Chekina, N.V.Kravtsov, E.G.Lariontsev, A.A.Makarov, S.S.Sidorov, *Moscow State Univ., Russia,* L.A.Kotomtseva, N.A.Loiko, A.V. Naumenko, S.G.Rusov, *Stepanov Inst. of Phys., Belarus.* Dynamics of a solid-state ring laser with periodic pump modulation is studied theoretically and experimentally. By changing phase nonreciprocity of the laser cavity, we observe two groups of the periodic and chaotic lasing regimes: the regimes of phase synchronization of the counterpropagating waves and the beat regimes.

FT25 • Nonlinear dynamics of singular wave field at laser beam propagation through optical inhomogeneities, V.P.Aksenov, O.V.Tikhomirova, *Inst. of Atmospheric Optics, Russia,* I.V.Izmailov, B.N.Poizner, *Tomsk State Univ., Russia.* The transformation of a smooth wavefront into a singular front is studied. The intensity and phase, the phase gradient and Umov-Pointing vector in the transverse plane are investigated as functions of the longitudinal coordinate. The regularities for the energy streamlines and evolution of the singular points system for the phase gradient vector field have been established.

FT26 • Time-delayed nonlinear optical systems: temporal instability and cooperative chaotic dynamics, S.S.Chesnokov, A.A.Rybak, V.I.Stadnichuk, *Moscow State Univ., Russia.* We study numerically a nonlinear optical system, which exhibits spatiotemporal chaotic-type behavior. On the base of statistical analysis we discuss possibility of applications of this system for an artificial optical turbulence generation.

FT27 • On possibility of self-injection realization in STRML-laser with chirped USP, B.V.Anikeev, V.N.Khramov, R.Sh. Zatrudina, V.V.Rudov, S.A.Dronov, *Volgograd State Univ., Russia.* The possibilities of realization an intracavity self injection regime in laser with short-term resonant modulation of losses (STRML) have been investigated. It is shown by calculations, analytically and experiments that natural chirp is proper to USP of the STRML-laser. The monoblock construction of electrooptical double modulator for the STRML-laser has been represented.

FT28 • Suppression of chaos in a laser diode with the external optical feedback, V.V.Jakutkin, S.P.Kotova, *Lebedev Physical Inst., Samara Branch, Russia.* The experimental results of the chaotic dynamics suppression in a laser diode with external optical feedback are presented and discussed. The suppression system is based on the Pyragas control technique. The feedback-induced intensity noise and spectrum broadening are reduced by small perturbation in the laser current, which a proportional to the intensity changes in a roundtrip time of light.

FT29 • Broadband semiconductor saturable absorber dispersion controlled mirrors for mid-IR lasers, N.D.Goldina, V.I.Trunov, E.V.Pestryakov, *Inst. of Laser Phys., Russia.* Design of novel integrated structure—semiconductor broadband saturable-absorber dispersion controlled mirrors (SESADCM) for mid-IR lasers is discussed. SESADCM design for Cr:ZnSe laser is analyzed in detail.

FT30 • Effect of inhomogeneities on features of solitons in passive driven nonlinear interferometers, G.A.Chizhova, *S.t-Petersburg State Inst. for Fine Mechanics and Optics, Russia,* N.N.Rosanov, *Res. Inst. for Laser Phys., Russia.* Effect of small- and large-scale inhomogeneities of characteristics of coherent driven radiation and optical scheme on main features of localized structures—dissipative optical solitons—in interferometers with threshold nonlinearity is studied analytically. Possibilities of applications to information processing are discussed.

FT31 • An adaptive loop resonator with auxiliary mirror, V.B.Tsvetkov, D.A.Nikolaev, G.A.Bufetova, I.A.Shcherbakov, *General Phys. Inst. Russia.* We demonstrate that using the intracavity beams as writing beams and output beam as a signal one in degenerate FWM in Cr^{4+}-doped crystals may affect significantly for operation of laser with a loop resonator.

FT32 • Laser stabilization by combination of positive and negative delayed feedback loops, M.V.Gorbunkov, Yu.V.Shabalin, *Lebedev Phys. Inst., Russia.* Combination of positive and negative delayed feedback loops was Appl. to control laser operation resulting in dramatical stability zone increase. In self mode-locking regime additional positive feedback loop provides pulse shortening.

FT33 • Localized structures and circular domain walls in a vectorial Kerr cavity, D.Gomila, P.Colet, M.San Miguel, *IMEDEA (CSIC-UIB), Spain,* G.-L.Oppo, G.Harkness, *Univ. of Strathclyde, UK.* Two kinds of localized structures, dark cavity solitons and circular domain walls, are found in different regimes in self-defocusing vectorial Kerr cavities. In the former (later) regime droplets shrink (grow) as $R(t) \approx t^{-1/2}$ ($R(t) \approx t^{1/3}$)

FT34 • Hexagonal pattern correlations in a Kerr cavity, D.Gomila, P.Colet, *IMEDEA (CSIC-UIB), Spain.* We study the fluctuations and correlations in a hexagonal pattern in a Kerr cavity. Correlations between intensity fluctuations of the fundamental harmonics can be understood in terms of momentum conservation.

FT35 • From hexagons to optical turbulence, D.Gomila, P.Colet, *IMEDEA (CSIC-UIB), Spain.* Competition between the self-focusing Kerr effect, diffraction, losses and pumping, makes a static hexagonal pattern undergo consecutive instabilities until optical turbulence appears. We show here how the transition takes place.

FT36 • Polarization coupling and transverse effects in type-II optical parametric oscillator, G.Izús, M.San Miguel, *IMEDEA (CSIC-UIB), Spain.* Transverse pattern formation and Bloch domain walls in type-II optical parametric oscillator are theoretically predicted and numerically studied when a direct polarization coupling between the down converted fields is taken into account.

FT37 • Mode characteristics of oxide-confined VCSELs, P.S.Ivanov, I.A.Sukhoivanov, *Kharkov State Tech. Univ. of Radio Electronics, Ukraine.* Dynamical, power and modulation characteristics of Oxide–Confined Vertical-Cavity Laser with the goal of lasing characteristics optimisation are investigated. Results are shown the possibility of the separate mode allocation for improving of device operating parameters.

FT38 • Dynamical behavior of two coupled semiconductor lasers, E.Tolkacheva, *Stepanov Inst. of Phys., Belarus,* J.Tredicce, *Inst. NonLineaire de Nice, France.* The model is presented describing the dynamical behavior of two semiconductor lasers coupled in Fabry-Perot configuration at different frequency regimes: at resonance, close to the resonance, far from the resonance.

Hall 1

8:30–10:30
SA • Novel Trends in Nonlinear Laser Spectroscopy and Optical Diagnostics I
W.Kiefer, *Univ. of Würzburg, Germany, Presider*

8:30
SA1 (Keynote) • Resonant nonlinear magneto-optical effects in atomic vapors and beams, A.Weis, *Univ. de Fribourg, Switzerland.* We review the use of spin coherent atomic ensembles for investigating strongly suppressed processes such as biomagnetism, the tomography of gas phase diffusion, or the measurement of forbidden polarizabilities and local fields in quantum crystals.

Hall 2

8:30–10:30
SB • Strong Laser Fields and High Field Physics I
V.M.Gordienko, *Moscow State Univ., Russia, Presider*

8:30
SB1 (Keynote) • UVX/IR multiphoton ionization, P.Agostini, *CEA DSM/ DRECAM/SPAM, France.* Electron spectrometry in UVX/IR multiphoton Ionization of atoms reveals circular dichroism, ponderomotive shift of the ionization potential and quantum interferences. Applications to characterization of femtosecond pulses and attosecond pulse trains from High Harmonics are presented.

Hall 3

8:30–10:30
SC • Ultrafast Phenomena IV
V.V.Shuvalov, *Moscow State Univ., Russia, Presider*

8:30
SC1 (Invited) • Femtosecond spectroscopy of photochemical reaction from high-exciting electron states and dynamics of coherent intramolecular vibrations of polyatomic molecules. Yu.A. Matveets, V.O.Kompanets, S.E.Vinogradov, A.L. Dobryakov, V.S.Letokhov, *Inst. of Spectroscopy, Russia.* The ultrafast photochemical processes in polyatomic molecules were investigated by intense ultrashort UV or visible laser pulse. Analyzis of laser radiation parameters influence on the possibility of settling channels of photochemical reactions were carried out.

9:00
SC2 (Invited) • Nonlinear spectroscopy of amorphous quantum structures, E. A. Vinogradov, *Inst. of Spectroscopy, Russia.* Optical properties and nonlinear reflection-absorption spectra and second-harmonic generation with dispersive nonlinearity have been investigated in the multilayered amorphous very thin films structure formed by the α-Si/SiO_2 multiple quantum wells.

Hall 4

8:30–10:30
SD • Nonlinear Dynamics of Optical systems V
R.Vilaseca, *Univ. Politecnica de Catalunua, Spain, Presider*

8:30
SD1 (Invited) • Pattern precursors in a liquid crystal with optical feedback, P.Glorieux, E.Louvergneaux, C.Szwaj, *Univ. des Sciences et Technologies de Lille, France.* Pattern formation in the near threshold region has been investigated in a liquid crystal system with feedback in presence of noise. We show experimentally and numerically that noisy pattern precursors exist before the appearance of ordered patterns.

9:00
SD2 (Invited) • Optical pattern formation far beyond threshold: multiple instability balloons, superlattices and effects of wavefront curvature, T.Ackemann, E.Große Westhoff, M.Pesch, D.Rudolph, W.Lange, *Westfälische Wilhelms-Univ. Münster, Germany.* The formation of new superlattice patterns is studied experimentally in a single-mirror feedback system far beyond threshold. The importance of high order instability balloons and of the wavefront curvature of the input beam is demonstrated.

Hall 5

8:30–10:30
SE • Optical Information Processing, Transmission, and Storage I
J.Y.Son, *Korea Inst. of Science and Technology, Korea, Presider*

8:30
SE1 (Invited) • Status report on holographic data storage, H.J.Coufal, *Almaden Res. Center, USA.* The principles, the potential and the actual status of holographic data storage is discussed with particular emphasize on the open issues that have to be resolved to make it a viable technology.

9:00
SE2 (Invited) • Two-photon optical data storage, S.Magnitski, *Moscow State Univ., Russia.* Review of modern state of art of 3D two-photon optical memory is presented. The emphasis is made on multilayer systems with two-photon writing. Basic principles of two-photon writing of information both in parallel and consecutive schemes are considered. Physical-chemical properties of two-photon sensitive media are analyzed.

Hall 1

SA • Novel Trends in Nonlinear Laser Spectroscopy and Optical Diagnostics I (Continued)

9:15
SA2 (Invited) • CARS spectroscopy in local nonperturbing diagnostics of gaseous parameters, V.V.Smirnov, *General Phys. Inst., Russia.* The capabilities of Coherent Anti-Stokes Raman Scattering spectroscopy in application to problem of local nonperturbing diagnostics of gas parameters such as chemical composition, density, distribution of molecular energy between internal degree of freedom and temperature are discussed.

9:45
SA3 (Invited) • Time-resolved polarization-sensitive measurements of the electric field in a sliding discharge by means of dc-field-induced coherent Raman scattering, S.N.Tskhai, S.V.Mitko, V.N.Ochkin, A.Yu.Serdyuchenko, *Lebedev Phys. Inst., Russia,* D.A.Akimov, D.A. Sidorov-Biryukov, D.V.Sinyaev, A.M.Zheltikov, *Moscow State Univ., Russia.* Coherent Raman scattering involving the Q(1) transition of a hydrogen molecule is employed to determine the parameters of the electric field in the sliding discharge.

Hall 2

SB • Strong Laser Fields and High Field Physics I (Continued)

9:15
SB2 (Invited) • Relativistic behavior in atomic photoionization, H.R.Reiss, *American Univ., USA.* Relativistic photoionization effects include distortion of angular distributions, increased stabilization with circular polarization, decreased stabilization with linear polarization, and maxima in low frequency linear polarization spectra at energies even greater than the above-barrier energy.

9:45
SB3 (Invited) • Atomic stabilization in a strong laser field, A.M.Popov, O.V.Tikhonova, E.A.Volkova, *Moscow State Univ., Russia.* Laser-induced photoionization of the 3D system with both Coulomb and short-range potential are investigated by means of the direct numerical integration of the nonstationary Schroedinger equation. Comparative analysis of different mechanisms of the ionization suppression is presented.

Hall 3

SC • Ultrafast Phenomena IV (Continued)

9:30
SC3 (Invited) • Determination of localization of carriers in disorderd semiconductors by femtosecond spectroscopy, Yu.E.Lozovik, A.L.Dobryakov, S.P.Merkulova, S.Volkov, *Inst. of Spectroscopy, Russia,* S.A.Kovalenko, N.P.Ernsting, *Inst. Humboldt Univ., Germany.* A new method for determination of the mobility edge in the disorder materials by femtosecond pump-supercontinuum probe spectroscopy is presented.

Hall 4

SD • Nonlinear dynamics of Optical Systems V (Continued)

9:30
SD3 • Spatio-temporal modulation instability of optical radiation with SHG in a planar waveguide, A.K Sukhorukova, *Moscow State Geological Acad., Russia,* A.P.Sukhorukov, *Moscow State Univ., Russia.* Optical modulation instability of impulse laser beams in quadratically nonlinear slabs was theoretically investigated. The competing contributions of spatial noise and aberrations were considered. We shown the temporal tails make a significant energy background.

9:45
SD4 • Polarization bad cavity limits in a vector class-B laser, A.M.Kul'minskii, Yu.V.Loiko, A.P.Voitovich, *Inst. of Mol. and Atomic Phys., Belarus.* The effect of the cavity anisotropies on the onset of instabilities in a vector class-B laser is studied. We show that phase anisotropy can cause the instabilities below the polarization bad cavity limit of an isotropic-cavity laser.

Hall 5

SE • Optical Information Processing, Transmission, and Storage I (Continued)

9:30
SE3 (Invited) • Second harmonic generated hologram for superfast information processing, Yu.N.Denisyuk, *Ioffe Phys.-Tech. Inst., Russia,* A.Andreoni, M.Bondani, M.Potenza, *Univ. de gli studi dell'Insubria, Italy.* A new type of holograms recorded in nonlinear materials using their second order nonlinearity is suggested. These holograms generate 3-D images without any time delay and can be used for very fast information processing.

Hall 1	Hall 2	Hall 3	Hall 4	Hall 5
SA • Novel Trends in Nonlinear Laser Spectroscopy and Optical Diagnostics I (Continued)	**SB • Strong Laser Fields and High Field Physics I (Continued)**	**SC • Ultrafast Phenomena IV (Continued)**	**SD • Nonlinear dynamics of Optical Systems V (Continued)**	**SE • Optical Information Processing, Transmission, and Storage I (Continued)**
		10:00 ***SC4 • Optimal control of the current through a double quantum dot,*** I.Grigorenko, O.Speer, M.Garcia, *Inst. für Theor. Phys. der Freien Univ., Germany.* The time dependent charge transfer between quantum dots induced by an ultrashort electric field is theoretically analyzed. We perform optimal control of the current by appliyng an evolutionary algorithm.	*10:00* ***SD5 • Self-diffraction of the beams in linear three-mirrors cavity of Nd-laser,*** D.A.Nikolaev, V.B.Tsvetkov, I.A.Shcherbakov, *General Phys. Inst., Russia,* O.L.Antipov, *Inst. of App. Phys., Russia.* Experimentally demonstrated the high efficiency of the diffraction of the intracavity emission of free-running and Q-switched Nd-laser, being brought about by the interference of the splitted intracavity beams in the active rod.	*10:00* ***SE4 • Optical storage of information via refreshing by inverse seeding in photorefractive $Ba_{0.77}Ca_{0.23}TiO_3$ crystal (BCT),*** V.Matusevich, A.Kiessling, R.Kowarschik, *Friedrich Schiller Univ. Jena, Germany.* A new experimental setup for optical storage of information via refreshing by inverse seeding (OSIRIS), which gives a sixfold increase of the storage time of holograms in a single $Ba_{0.77}Ca_{0.23}TiO_3$ crystal (BCT), will be presented.
10:15 ***SA4 • Degenerate four-wave mixing and polarization spectroscopy in NO_2,*** L. De Dominicis, R.Fantoni, M.Giorgi, *ENEA C.R. Frascati, Italy.* Degenerate four-wave mixing and polarization spectroscopy have been used to detect NO_2 in static cell and in flame. The role played by population and thermal gratings in the DFWM case has been investigated. PS measurements performed with different configurations allowed to resolve NO_2 composite spectral features.	*10:15* ***SB4 • Weakly relativistic laser ionization dynamics,*** A.Scrinzi, T. Brabec, *Vienna Univ. of Technology, Austria,* M.Walser, *Univ. of Freiburg, Germany.* High intensity laser ionization is investigated numerically and analytically. Electron and harmonic spectra are modified by non-dipole terms of the field. The validity of strong field and quasi-classical approximations is investigated.	*10:15* ***SC5 • Femtosecond CARS thermometry,*** T.Lang, M.Motzkus, *Max-Planck-Inst. für Quantenoptik, Germany.* Femtosecond coherent anti-Stokes Raman spectroscopy is introduced as a new method for studies of flames and combustion processes. An extension of this technique is applied in high repetitive single shot thermometry.	*10:15* ***SD6 • Excitability, selfpulsations and coexistence in an optically injected diode laser,*** S.Wieczorek, D.Lenstra, *Vrije Univ. Amsterdam, The Netherlands,* B.Krauskopf, *Univ. of Bristol, UK.* The richness of nonlinear phenomena in the locking regime is revealed. Excitability, selfpulsation and coexistence of the steady signal with different types of oscillations are found and explained by underlying homoclinical bifurcations.	*10:15* ***SE5 • Higher-order holographic associative memories and image processing,*** P.V.Polyanskii C.V.Fel'de, *Chernivtsi Natl. Univ., Ukraine.* Associative memory using higher diffraction orders of a nonlinearly recorded hologram is substantiated and demonstrated. It is shown that diverse operations on processing of the reconstructed associative response are simultaneously realized in different diffraction orders.

10:30–11:00 COFFEE BREAK

Hall 1

11:00–13:00
SF • Novel Trends in Nonlinear Laser Spectroscopy and Optical Diagnostics II
V.A.Orlovich, *Stepanov Inst. of Physics, NASB, Belarus, Presider*

11:00
SF1 (Invited) • Optimal coherent control of the molecular FWM response by arbitrarily shaped femtosecond pulses, M.Motzkus, *Max-Planck-Inst. für Quantenoptik, Germany.* Coherent control of wave packet dynamics is demonstrated with arbitrarily shaped laser pulses. New solutions for control pulses are designed by an evolutionary algorithm in a learning loop without previous knowledge of the potentials.

11:30
SF2 (Invited) • Vibrational kinetics of ultrafast intramolecular electron transfer studied by picosecond resonance Raman spectroscopy, W.Werncke, *Max-Born-Inst., Germany.* We investigate the role of vibrational modes in photoinduced ultrafast electron transfer - in particular in the back-electron transfer of betaine-30 - by stationary and picosecond time-resolved resonance Raman spectroscopy combined with ab initio calculations.

Hall 2

11:00–12:30
SG • Strong Laser Fields and High Field Physics II
P.Agostini, *CEA DSM/ DRECAM/SPAM, France, Presider*

11:00
SG1 (Invited) • Quantum effects in above-threshold ionization, G.G.Paulus, F.Grasbon, H.Walther, *Max-Planck-Inst. für Quantenoptik, Germany.* We report on several quantum effects observed in high-precision above-threshold ionization experiments. They clearly show the limits of the classical model but are explainable within the framework of the strong-field approximation as interferences of quantum trajectories.

11:30
SG2 (Invited) • Recoil-ion and electron momentum distributions for single and double ionization in strong laser fields, H.Giessen, G.Urbasch, M.Vollmer, *Philipps-Univ. Marburg, Germany,* T.Weber, M.Weckenbrock, A.Staudte, R.Dörner, *Univ. Frankfurt, Germany.* We measured the momentum distributions of singly and doubly charged He ions in the focus of 800 nm 220 fs laser pulses around 10^{14} W/cm^2. For double ionization of Ar we measured the momentum of one electron in coincidence with the ion momentum. We find a strong correlated emission of

Hall 3

11:00–12:30
SH • Ultrafast Phenomena V
E.A.Vinogradov, *Inst. of Spectroscopy, RAS, Russia, Presider*

11:00
SH1 (Invited) • Impulsive generation of phonon polaritons: Cherenkov emission at subluminal speeds, R.Merlin, T.E.Stevens, J.K.Wahlstrand, *Univ. of Michigan, USA,* J.Kuhl, *Max-Planck-Inst. FKF, Germany.* We report Cherenkov emission by a light pulse moving at speeds below the infrared threshold and show that impulsive generation of coherent polaritons and Cherenkov radiation are the same physical phenomenon.

11:30
SH2 (Invited) • Modification and ablation of transparent dielectrics by femtosecond laser radiation, N.M.Bityurin, A.N.Stepanov, A.A.Babin, A.I.Korytin, A.P.Alexandrov, N.A.Babina, A.M.Kiselev, A.I.Kuznetsov, D.I.Kulagin, V.V.Lozhkarev, A.Yu.Malyshev, S.V.Muraviov, A.M. Sergeev, *Inst. of Appl. Phys., Russia.* Bulk modification of dielectrics (pure and doped polymers and halcogenide glasses) by focused beams of a femtosecond Ti:Sa laser and its harmonics, as well as surface ablation, is investigated experimentally and theoretically.

Hall 4

11:00–12:45
SI • Nonlinear Dynamics of Optical systems VI
N.A.Loiko, *Stepanov Inst. of Physics, NASB, Belarus, Presider*

11:00
SI1 (Invited) • Laser amplification of resonant and coherent injected fields down to the femtowatt range, *G.M.Stephan, ENSSAT, France.* We describe an experiment in which a resonant and coherent light is injected into a laser. The amplification effect allows an observation limit of 0.2 photon per correlation time. Quantum theory is applied to this result.

11:30
SI2 (Invited) • High power double-clad Yb-doped fiber laser, A.Hideur, T.Chartier, S.Louis, M.Brunel, *Univ. de Rouen, France,* F.Sanchez, *Univ. d'Angers, France.* We present our recent experimental results obtained with a high power side-pumped Yb-doped double-clad fiber laser.

Hall 5

11:00–12:30
SJ • Optical Information Processing, Transmission, and Storage II
H.Coufal, *IBM Almaden Research Lab., USA, Presider*

11:00
SJ1 (Invited) • Holographic screens for 3-dimensional image projection, its current status and perspective, Jung-Young Son, *Korea Inst. of Sci. and Technology, Korea.* Holographic screens are developed for projecting full color 3-dimensional images. The currently available size of them is 40 inches. They will soon be adopted in 3-D game machines and monitors as the main image projection screen.

11:30
SJ2 (Invited) • Transfer, storage and multiplexing of optical signals in bistable planar semiconductor structures, A.M.Goncharenko, G.N.Sinitsyn, *Div. for Optical Problems in Inform. Technologies, Belarus.* Principles of formation and controlled propagation of switching autowaves in optically bistable interferometer are considered. A number of methods and devices are developed for processing optical information signals in 2D-array of such interferometers. Limiting operation parameter of the devices are discussed.

Hall 1	Hall 2	Hall 3	Hall 4	Hall 5
SF • Novel Trends in Nonlinear Laser Spectroscopy and Optical Diagnostics II (Continued)	**SG • Strong Laser Fields and High Field Physics II (Continued)**	**SH • Ultrafast Phenomena V (Continued)**	**SI • Nonlinear Dynamics of Optical Systems VI (Continued)**	**SJ • Optical Information Processing, Transmission, and Storage II (Continued)**
	both electrons with similar momentum to the same side.			
12:00 ***SF3 (Invited) • High-resolution spectroscopy of inhomogeneously broadened Raman resonances by time-domain CARS,*** V.B.Morozov, A.N.Olenin, V.G.Tunkin, *Moscow State Univ., Russia.* Time-domain technique was used for experimental investigation of narrow molecular resonances of H and CO_2 with total width about 10^{-2}–$10^{-3}cm^{-1}$ and with spectral shape profile governed by several physical mechanisms. Experimental pulse responses were measured in delay time range up to 12 ns. Qualitative and of numerical analysis of the results will be discussed.	*12:00* ***SG3 (Invited) • Strong-field interference stabilization in molecules,*** M.V.Fedorov, M.E.Sukharev, *General Phys. Inst., Russia.* Stabilization of molecules with respect to photo-dissociation by a strong light field is shown to exist. Mechanism of stabilization is shown to be related to Raman-type transitions between vibrational levels of a molecule.	*12:00* ***SH3 • Transient deformations of solid surfaces irradiated by ultrashort laser pulses,*** V.V.Temnov, K.Sokolowski-Tinten, D. von der Linde, *Univ. of Essen, Germany.* Dynamics of solid surfaces after irradiation by fs laser pulses below and above the ablation threshold is studied by means of time- and space-resolved optical interferometry. The formation of a sharp ablation front expanding towards vacuum with velocities of several hundreds m/s is observed slightly above the ablation threshold. The reversible thermal expansion with velocities up to 100 m/s is detected below the ablation threshold. *12:15* ***SH4 • Band gap collapse and ultrafast "cold" melting in GaAs and Si within 100 fs pumping laser pulse,*** S.I.Kudryashov, V.I.Emel'yanov, *Moscow State Univ., Russia.* It was shown experimentally that excitation of electron-hole plasma in GaAs and Si by a 100 fs pumping laser pulse results in the "red" shift of their optical absorption bands and the bandgap collapse followed by the "cold" melting within duration of the pulse.	*12:00* ***SI3 • CW-pumped erbium fiber laser passively Q-switched with Co^{2+}:ZnSe crystal,*** A.V.Kir'yanov, V.N.Filippov, A.N.Starodumov, *Centro de Investigaciones en Optica A.C., Mexico.* A novel low-threshold erbium fiber laser passively Q-switched with a Co^{2+}:ZnSe crystal is demonstrated experimentally and simulated numerically. *12:15* ***SI4 • Multistability in loss-modulated class B lasers induced by weak periodic perturbations,*** V.N.Chizhevsky, *Stepanov Inst. of Phys., Belarus.* It is shown experimentally and numerically that resonant perturbations at subharmonic frequencies can induce multistability in loss-modulated class B lasers. The number of attractors depends on the initial dynamical state, the amplitude and phase of the resonant periodic perturbations.	*12:00* ***SJ3 (Invited) • Theoretical aspects and potential applications of cavity solitons in semiconductor microresonators,*** T.Maggipinto, M.Brambilla, I.M.Perrini, *Univ. e Politecnico di Bari, Italy,* G.Tissoni, L.Spinelli, *Univ. dell'Insubria, Italy.* We derive a model, which includes the role of thermal nonlinearities, to describe the formation of Cavity Solitons in semiconductor microresonators. A Newton-Fourier method is then applied to gain quantitative information on CS dynamical properties.

Hall 1	Hall 2	Hall 3	Hall 4	Hall 5

SF • Novel Trends in Nonlinear Laser Spectroscopy and Optical Diagnostics II (Continued)

12:30
SF4 • Coherent four-wave mixing in hollow waveguides: expanding the possibilities of gas-phase analysis, A.N.Naumov, A.B.Fedotov, O.A.Kolevatova, D.A.Sidorov-Biryukov, A.M.Zheltikov, *Moscow State Univ., Russia,* F.Giammanco, P.Marsili, A.Ruffini, *Univ. of Pisa, Italy.* The possibilities of using four-wave mixing enhanced in hollow fibers for improving the sensitivity of gas-phase analysis are explored. The influence of phase matching and high-order waveguide modes is studied.

12:45
SF5 • Three wave Brillouin interaction in optical fiber, V.A.Saetchnikov, E.A.Chernyavskaya, T.P.Yanukovich, *Belarussian State Univ., Belarus.* The metod of Brilloin optical frequency-domain analysis (BOFDA) is discussed. Pump, stokes and acoustic are interacting in the present model for numerical simulation of a BOFDA. Temperature and strain distribution along fiber is determined.

SI • Nonlinear Dynamics of Optical Systems VI (Continued)

12:30
SI5 • Dispersion phase-modulation bistability of passive mode-locked lasers, F.M.Mitschke, *Univ. Rostock, Germany,* A.K.Komarov, K.P.Komarov, *Inst. of Automation and Electrometry, Russia.* Novel generation bistability for passive mode-locked lasers is found. Because of this bistability the self-start of passive mode-locking is realized only with specific initial conditions. Obtained results are compared with corresponding experimental ones for Ti:sapphire laser with Kerr-lens.

12:45
SI6 • Resonance reflection from and transmission trough a dense glassy film of oriented J-aggregates, A.A.Bogdanov, I.V.Ryzhov, A.I.Zaitsev, *Herzen Pedagogical Univ., Russia,* V.A.Malyshev, *Vavilov State Optical Inst., Russia.* A theoretical study of the resonance optical response of a J-aggregated film is carried out. We report bistability, self-oscillations and chaotic behavior of transmittivity and reflectivity of the system originated from saturation of the nonlinear refraction index.

12:30–14:00 LUNCH (on your own)

Hall 1

14:00–16:00
SK • Novel Trends in Nonlinear Laser Spectroscopy and Optical Diagnostics III
D. von der Linde, *Univ. of Essen, Germany, Presider*

14:00
SK1 (Invited) • Methods of laser spectroscopy on the forbidden $2^1S–2^3S$ transition of helium, E.V.Baklanov, *Inst. of Laser Physics, Russia.* Two methods of laser spectroscopy for the $2^1S–2^3S$ forbidden transition of helium are considered: linear absorption and stimulated Raman scattering. Analysis made has shown that the measurement this transition frequency is possible.

14:30
SK2 • Coherent effects on Zeeman sublevels of barium intercombination transition $^{61}S_0–^{63}P_1$, D.Sarkisyan, A.Papoyan, *Inst. for Phys. Research, Armenia.* Nonlinear Faraday effect on Ba intercombination line has been realized for the first time. A narrow peak of 200 mG-width has been observed for the radiation passed through crossed-polarizers with the conversion efficiency of 10^{-3} in sealed-off Ba vapor sapphire cell.

Hall 2

14:00–16:00
SL • Strong Laser Fields and High Field Physics III
M.V.Fedorov, *General Physics Inst., RAS, Russia, Presider*

14:00
SL1 (Invited) • Molecular above threshold ionization (ATI) and Coulomb explosion (CE) spectra using a moving adaptive grid method for numerical solutions of the molecular time dependent Schroedinger equation (TDSE) in intense laser fields, A.D.Bandrauk, S.Chelkowski, I.Kawata, H.Z.Lu, *Univ.de Sherbrooke, Canada.* We present a moving adaptive grid method for solving the TDSE for molecules in intense laser fields, applicable in the nonpertrubative nonlinear regime where dissociaitive ionization occurs. Comparison of convergence between the same discretization schemes for different gauges demonstrates the superiority of the present Lagrangean adaptive grid method to treat the response of molecules to intense time dependent electromagnetic fields. Simulations of ATI and CE spectra will be presented in exact non Born-Oppenheimer calculations of the TDSE for the one electron H_2^+, H_3^{++} and two electrons H_2, H_3^+. An important result of these simulations is that ultshort ($t<5$ fs) intense laser pulses ($I>10^{15}$ W/cm^2) will be new tools for measuring the dynamics of moving nuclear wave packets.

14:30
SL2 (Invited) • Shaping molecular beams with light, T.Seideman, *Steacie Inst. for Mol. Sci., Canada.* Moderately intense lasers are capable of aligning molecules while manipulating their center-of-mass motion. Potential applications range from nanoscale surface processing to separation of racemic mixtures into pure enantiomers and control of electron transfer reactions.

Hall 3

Hall 4

14:00–16:00
SN • Postdeadline Papers I
TBA, *Presider*

Hall 5

14:00–16:00
SO • Optical Information Processing, Transmission, and Storage III
S.A.Magnitski, *Moscow State Univ., Russia, Presider*

14:00
SO1 • Analysis of associative reconstruction of information by thin holograms with superposed registration, A.S.Rubanov, L.M.Serebryakova, *Stepanov Inst. of Phys., Belarus.* On the example of lensless Fourier holograms the associative (by a fragment) reconstruction and processing of information, based upon the use of nonlinearity in the processes of recording and reading of thin superposed holograms, are theoretically investigated.

14:15
SO2 • Effect of false writing of information in optical processor and optical storage devices realizing on the base of nonlinear absorption, V.A.Trofimov, *Moscow State Univ., Russia.* Effect of false writing of information in optical data storage devices and all-optical switching devices based on nonlinear absorption is analyzed. One has shown that diffraction of laser beam may result in formation of additional longitudinal and transverse domains in optical data storage devices.

14:30
SO3 (Invited) • Functional optical fiber Bragg grating devices and their applications, Sang Bae Lee, *Korea Inst. of Sci. and Technology, Korea,* Sang Sam Choi, *Korea Photonics Technology Inst., Korea.* We have developed a variety of fiber grating-based applications such as an optical channel-switching filter, optical CDMA spectral coding technique, and a bridge-monitoring static FBG sensor system.

Hall 1

SK • Novel Trends in Nonlinear Laser Spectroscopy and Optical Diagnostics III (Continued)

14:45
SK3 (Invited) • Single nitrogen-vacancy defect centers in diamond: spectroscopy and quantum-optical applications, A.P.Nizovtsev, S.Ya.Kilin, *Stepanov Inst. of Phys., Belarus.* We introduce the photophysical model of Nitrogen-Vacancy defect center in diamond and demonstrate its applicability to describe consistently a wide range of experiments dealing both with single centers and with their ensembles. Possibility to build a quantum computer at 13C nuclear spins neighboring the center will be discussed.

15:15
SK4 • Single molecule spectroscopy of molecules isolated in solid-deposited matrices, A.Starukhin, A.Shulga, *Inst. of Mol. and Atomic Phys., Belarus,* J.Sepiol, R.Kolos, *Inst. of Phys. Chem., Poland,* A.Renn, U.P.Wild, *ETH-Zentrum, Switzerland.* Matrix isolation technique for dierctly deposition of molecules on the objective surface is presented. The spectroscopic properties of many single terrylene, dibenzanthanthrene and Mg-tetrazaporphyrin molecules in vapor deposited Shpol'skii and rare gas matrixes have been investigated.

Hall 2

SL • Strong Laser Fields and High Field Physics III (Continued)

15:00
SL3 (Invited) • The evolution of deuterium clusters irradiated by super-intense ultra-short laser pulses, V.P.Krainov, *Moscow Inst. of Phys and Technology, Russia,* M.B.Smirnov, *RRC "Kurchatov Institute", Russia.* Processes of inner and outer ionization, electron heating, Coulomb explosion and nuclear fusion for deuterium clusters irradiated by super-intense ultra-short laser pulses are considered. Recent experimental data on nuclear fusion are discussed.

Hall 3

Hall 4

SN • Postdeadline Papers I (Continued)

Hall 5

SO • Optical Information Processing, Transmission, and Storage III (Continued)

15:00
SO4 (Invited) • Quasisolitons, V.N.Serkin, *General Phys. Inst., Russia, Benemerita Univ.Autonoma de Puebla, Mexico.* Quasisolitons methodology developed provides for a systematic way to find novel stable "soliton islands" in a "sea of solitary waves" of the nonlinear Schrödinger equation model with varying dispersion, nonlinearity, and gain or absorption. Fundamental soliton management regimes are considered: soliton dispersion management, soliton energy and intensity control, soliton optimal compression and amplification, combined nonlinear and dispersion management.

Hall 1	Hall 2	Hall 3	Hall 4	Hall 5
SK • Novel Trends in Nonlinear Laser Spectroscopy and Optical Diagnostics III (Continued)	**SL • Strong Laser Fields and High Field Physics III (Continued)**		**SN • Postdeadline Papers I (Continued)**	**SO • Optical Information Processing, Transmission, and Storage III (Continued)**
15:30 ***SK5 • Broad-band anti-Stokes emission from (dye molecules)/(silver fractal aggregates)/microcavity composites,*** V.P.Safonov, N.S.Zakovryashin, *Inst. of Automation and Electrometry, Russia.* Huge enhancements of excitation and emission processes in multiplex resonator, formed by nano-resonator (fractal aggregate) and by microresonator, provides observation of long-time broad-band luminescence from adsorbate triplet states under multiphoton excitation.	*15:30* ***SL4 • Electronic dynamics of molecular excitation and multi-electron ionization in ultra-short laser pulses,*** *A.I.Pegarkov, Voronezh State Univ., Russia.* Electronic dynamics of excitation and ionization of diatomic molecules in short laser pulses is studied within a model of two active 1D electrons moving in the field of frozen core.			*15:30* ***SO5 • Thermal crosstalk analysis of vertical-cavity surface-emitting laser arrays,*** S.M.Zakharov, *Inst. for Microprocessors RAS, Russia,* E.A.Manykin, *RRC "Kurchatov Institute", Russia.* A different model approaches to the solving of thermal problems in a vertical-cavity surface-emitting laser array (VCSEL) have been developed. The basic attention concentrates on the analytical analysis for the thermal field out of the laser area. Thermal reciprocal crosstalk in the operating VCSEL's are considered.
15:45 ***SK6 • New opportunities in solution of inverse problems in laser spectroscopy due to application of artificial neural networks,*** I.V.Boychuk, I.V.Churina, S.A.Dolenko, T.A.Dolenko, V.V.Fadeev, I.G.Persiantsev, *Moscow State Univ. Russia.* Inverse problems in laser spectroscopy are reported to be successfully solved by application of artificial neural networks, a powerful data processing technique that performs better than traditional variation algorithms of solving inverse problems.	*15:45* ***SL5 • The anomalous thermal mechanism of the filamentation of the high intensity radiation in collision plasmas,*** V.P.Silin, *Lebedev Phys. Inst., Russia.* It is determined the region of the intensities of the pump radiation where the thermal mechanism of the inverse bremsstrahlung absorption and the electron heat conduction exerts the stabilization influence onto the filamentation instability of the high power radiation in the strong collision plasmas.			*15:45* ***SO6 • Two-wave coupling in azo-containing photosensitive polymers with liquid crystal properties,*** M.S.Andreeva, A.N.Simonov, V.I.Shmalhauzen, *Moscow State Univ., Russia.* Two-wave mixing dynamics in the film of azo-containing LC polymer at different conditions (beam intensities ratio, their polarizations, and polymer temperature) was studied experimentally and theoretically. Theoretical model considering effects of light absorption, nonlinear saturation and diffusion was suggested.

16:00–16:30 COFFEE BREAK

Hall 1

16:30–18:45
SP • Novel Trends in Nonlinear Laser Spectroscopy and Optical Diagnostics IV
V.V.Smirnov, *General Physics Inst., RAS, Russia, Presider*

16:30
SP1 (Invited) • New developments in odd-wave mixing in isotropic chiral materials, P.Fischer, A.Albrecht, *Cornell Univ., USA.* Sum and difference frequency generation in isotropic mixtures of non-racemic chiral molecules is dramatically enhanced through special two-state resonances. Both theory and preliminary experimental efforts are discussed.

17:00
SP2 • Novel spectroscopic techniques for microscopic diagnostics of semiconductors, V.V.Yakovlev, *Univ. of Wisconsin, USA.*

Hall 2

16:30–18:30
SQ • Strong Laser Fields and High Field Physics IV
A.A.Afanas'ev, *Stepanov Inst. of Physics, NASB, Belarus, Presider*

16:30
SQ1 (Invited) • X-ray diffraction with subpicosecond time resolution, D.von der Linde, K.Sokolowski-Tinten, Ch. Blome, C.Dietrich, A.Tarasevitch, *Univ. Essen, Germany,* A.Cavalleri, C.W.Siders, J.A.Squier, C.P.J.Barty, K.R.Wilson, *Univ. of California, USA.* Ultrashort multi-keV X-ray pulses from femtosecond laser-produced microplamas are used to perform time-resolved X-ray diffraction studies of lattice waves and structural phase transitions in semiconductor crystals. Subpicosecond time resolution is demonstrated.

17:00
SQ2 (Invited) • Spectrum transformation of high intensity femtosecond laser pulses in gas-filled capillary tubes, A.A.Babin, D.V.Kartashov, A.M.Kiselev, V.V.Lozhkarev, A.N. Stepanov, *Inst. of Appl. Phys., Russia.* Ionization frequency blue shift and spectrum transformation of high intensity femtosecond laser pulses propagates in gas-filled capillary tubes are investigated both experimentally and theoretically for various gas pressures, gas species and capillary length. Our numerical simulations are in a good agreement with experimental results.

Hall 3

Hall 4

16:30–18:30
SS • Postdeadline Papers II
TBA, *Presider*

Hall 5

16:30–17:30
ST • Optical Information Processing, Transmission, and Storage IV
A.S.Rubanov, *Stepanov Inst. of Physics, NASB, Belarus, Presider*

16:30
ST1 • Nonlinear filtering of noisy interference fringes with the 2-D spatially-dependent filter impulse response, I.Gurov, M.Volkov, *Inst. of Fine Mech. and Optics, Russia.* An image enhancement and evaluation procedure is proposed based on the local gray-level histogram modification that presents new nonlinear data-dependent filtering applet to noisy images in the form of distorted fringe patterns.

16:45
ST2 (Invited) • All-optical signal processing for the next-generation fibre telecommunication networks, M.Marciniak, *Natl Inst. of Telecomm., Poland.* The impact of optical transparency on a successful deployment of future "IP over Optical" networks is discussed. Realization of networking functions with photonic components is summarized and directions of future development are pointed out.

Hall 1

SP • Novel Trends in Nonlinear Laser Spectroscopy and Optical Diagnostics IV (Continued)

17:15
SP3 • Second and third harmonic spectroscopy of magnetic garnet films, V.V.Pavlov, R.V.Pisarev, *Ioffe Phys. Tech. Inst., Russia,* M.Fiebig, D.Fröhlich, *Univ. Dortmund, Germany.* Second and third harmonic generation has been studied in thin films of pure and bismuth-substituted garnets in the spectral range 1.5–4.5 eV. A strong enhancement of SHG in the region of the d-d transitions near the band gap has been observed, whereas the THG depicts the maximum response above the band gap.

17:30
SP4 • Laser hypersound spectroscopy in Si and GaAs, N.V.Chigarev, D.Yu.Paraschuk, *Moscow State Univ., Russia.* We apply a deflection method of hypersound spectroscopy for Si and GaAs monocrystals. The profiles of hypersound pulses were measured using a pump-probe photodeflection technique. We show that the electron-deformation mechanism of photoacoustic conversion is dominated.

17:45
SP5 • Four-wave scattering by phonon polaritons under excitation of small polarons in $LiNbO_3$:Mg, G.Kh.Kitaeva, K.A.Kuznetsov, S.V.Solosin, and A.N.Penin, *Moscow State Univ., Russia.* We studied the cascaded coherent scattering of light by phonon polaritons in $LiNbO_3$:Mg crystals. Influence of small polarons on polariton k-spectra was discussed.

Hall 2

SQ • Strong Laser Fields and High Field Physics IV (Continued)

17:30
SQ3 (Invited) • High-order harmonic generation by limited beams. Spatial structure of the atomic response and phase-matching, V.T.Platonenko, *Moscow State Univ., Russia.* The analyses and numerical simulation show that the modulation of atomic response in the cross-section of laser beam can provide high efficiency of HOHG in extended medium under Cherenkov-Vavilov's phase-matching. Detailed calculations of harmonic amplitudes of atomic response are fulfilled by numerical integrating Shrödinger equation for hydrogen atom under oscillating electrical field. The intensity dependence of HOH amplitudes are modulated with depth close to unity.

Hall 3

Hall 4

SS • Postdeadline Papers II (Continued)

Hall 5

ST • Optical Information Processing, Transmission, and Storage IV (Continued)

17:15
ST3 • Enhanced semiconductor photorefractivity in presence of a magnetic field, P.Aghamkar, S.Nepal, Shiwani, Suta, *Guru Jambheshwar Univ., India.* Largest photorefractive gain co-efficient (24.5 m^{-1}) and efficient recording and erasing of a hologram with a fast response time is obtained in GaAs:Cr by two co-propagating pico-second light pulses in the presence of externally applied magnetic field.

Hall 1	Hall 2	Hall 3	Hall 4	Hall 5
SP • Novel Trends in Nonlinear Laser Spectroscopy and Optical Diagnostics IV (Continued)	**SQ • Strong Laser Fields and High Field Physics IV (Continued)**		**SS • Postdeadline Papers II (Continued)**	
18:00 ***SP6 (Invited) • Four-photon Raman spectroscopy as a method of the ocean remote sounding,*** A.F.Bunkin, K.I.Voliak, *General Phys. Inst., Russia.* Applicability of four-photon spectroscopy to remote diagnostics of the ocean is considered. It is shown that the advantages of nonlinear spectroscopy, such as the high level of a signal, enhanced spatial and time resolution can be realized in remote sensing. Experimental results on detection of small contamination in water are presented.	*18:00* ***SQ4 • High-order harmonic generation with frequency selection,*** V.D.Taranukhin, *Moscow State Univ., Russia.* Two-component pumping of atoms with strong low-frequency field and ultrashort pulse of high-frequency radiation is proposed for high-order harmonic generation. Under the definite relative phase of pump fields harmonic generation occurs with a frequency selection.			
	18:15 ***SQ5 • Interactions of relativistically intense laser pulses with low frequency waves in cold underdense plasmas,*** A.L.Galkin, V.V.Korobkin, O.B.Shiryaev, *General Phys. Inst., Russia.* Interactions of relativistically intense laser pulses with cold underdense plasmas are considered in 1D. Nonlinear localized electromagnetic waves in plasmas are the Akhiezer-Polovin waveforms with slow amplitudes self-modulated due to interactions with plasmons.			
18:30 ***SP7 • Laser diagnostics of the high temperature laser-induced phenomena,*** V.G.Prokoshev, A.F.Galkin, D.V.Abramov, S.D.Parfionov, S.M.Arakelian, *Vladimir State Univ., Russia.* The experimental studying of laser-induced hydrodynamic phenomena has been carried out. The form of free surface of melted material and distribution of temperature in a titanium sample under the laser radiation action were determined.				

19:00–22:00 CONFERENCE RECEPTION

Hall 1	Hall 2	Hall 3	Hall 4	Hall 5

8:30–11:15
SuB • Strong Laser Fields and High Field Physics V
TBA, *Presider*

8:30
SuB1 (Invited) • Short X-ray pulse generation towards time-resolved spectroscopy, N.Uesugi, *Tohoku Inst. of Technology, Japan,* H.Nakano, T.Nishikawa, K.Oguri, *NTT Basic Research Labs, Japan.* Soft X-ray generation properties were evaluated for both flat and structured targets such as nanohole–alumina and Au-nanocylinder targets. The time-resolved measurement of the inner-shell absorption change of Si during the irradiation of a fs laser pulse is achieved.

9:00
SuB2 (Invited) • Ultrashort X-ray pulse generation on long-lived atoms and ions in laser fields of subrelativistic intensities, M.Yu.Ryabikin, A.M.Sergeev, *Inst. of Appl. Phys., Russia.*

Hall 1	Hall 2	Hall 3	Hall 4	Hall 5

SuB • Strong Laser Fields and High Field Physics V (Continued)

9:30
SuB3 (Invited) • Production and applications of secondary sources of intense femtosecond laser systems, A.Rousse, *Ecole Polytechnique, France.* The new generation of ultrafast and intense laser systems provide researchers with state of the art tools to probe the matter under extreme conditions. Innovative physics experiments at relativistic intensities are coming out and applications of secondary sources, as ultrafast x-rays, open up new domains of research in multidisciplinary fields. A review of the recent achievements done at LOA in France will be done.

Hall 1	Hall 2	Hall 3	Hall 4	Hall 5

SuB • Strong Laser Fields and High Field Physics V (Continued)

10:00
SuB4 (Invited) • Nuclear processes in dense femtosecond plasma at moderate intensities, V.M.Gordienko, P.M.Mikheev, A.B.Savel'ev, R.V.Volkov, *Moscow State Univ., Russia.* We report on our experimental results on hot electrons, fast ions, and hard X-rays production in plasma created at the surface of laser microstructured targets by femtosecond laser pulses of moderate intensity, that enables us to observe low energy nuclear excitation and thermonuclear neutrons generation.

10:30
SuB5 (Invited) • Fusion neutron studies from D(d,n) ^{3}He reaction induced by 55fs, 10 Hz Ti:Sa-laser pulses, P.V.Nickles, O.Berndt, M.Kalashnikov, H.Ruhl, W.Sandner, *Max-Born-Inst., Germany,* D.Hilscher, U.Jahnke, *Hahn-Meitner-Inst., Germany.* Results of an efficient neutron source are reported. Solid $(CD_2)_n$-targets were irradiated by an ultra-intense 10 Hz Ti:Sa laser. Simulations of the deuteron acceleration and the neutron yield are in good agreement with the experiment.

Hall 1	Hall 2	Hall 3	Hall 4	Hall 5
	SuB • Strong Laser Fields and High Field Physics V (Continued)			

11:00
SuB6 • On absorption mechanism of ultrahigh contrast subpicosecond laser pulses by metal targets, L.L.Losev, V.I.Soskov, *Lebedev Phys. Inst., Russia.* It was shown that subpicosecond laser pulses with the contrast ratio of more than 10^{12} is absorbed in regime of normal skin-effect at laser intensity of up to $5 \cdot 10^{16}$ W/cm^2. The anomalous dependence of electron temperatures on laserpolaization was discovered.

11:30–12:00 CONFERENCE CLOSING

Key to Authors

Abramov D.V. — SP7
Abstreiter G. — FM2
Acevedo R. — WU23
Achasov O.V. — WX7
Ackemann T. — SD2
Adamchuk R.I. — ThN31
Adamson P. — WU8
Afanas'ev A.A. — FG2, FJ1, FT10, FT11, WE8, WS3, WY27
Afanasiev Y.V. — WT8
Affolderbach C. — WL1
Afilat S. — WD5
Agapov I.I. — ThN36
Ageev V.A. — WU31
Aghamkar P. — ST3, ThM11
Agishev I.N. — ThM24
Agostini P. — SB1
Aït Ameur K. — FT18, FT19, FT38
Akanaev B.A. — WU11
Akhrem A.A. — WI2
Akimov A.V. — FS2, ThO18
Akimov D.A. — FS20, SA3
Akopyan R.S. — WY6
Aksenov V.P. — FT25
Aktsipetrov O.A. — ThB3, WF2, WU19
Alaverdyan R.B. — WY6
Albrecht A. — SP1
Aleshkevich V.A. — ThH4, ThM7, ThM8
Alexandrov A.P. — SH2
Alexandrova E.N. — WD4
Alexeenko A.A. — WU32
Alexeev S.A. — WL4
Alfimov M.V. — WA2
Alidjanov E.K. — ThP18
Alimpiev A.I. — FF2
Aliverdiev A.A. — ThN3
Alodjants A.P. — FD2, ThO17
Alt W. — ThJ1
Aminova R.M. — ThN1
Amirova A.A. — ThN3
Amy-Klein A. — WB2
Anastasiyev A. — WT6
Andersen J.A. — ThO5
André R. — ThB4
Andreev A.V. — FQ13, TuB1, WF1, WO2, WU24, WY39
Andreev N.F. — ThM27, WL2, WT6
Andreev V.G. — WN3
Andreev Yu.M. — FP23, WY21
Andreeva C. — FD7
Andreeva M.S. — SO6
Andreeva O.V. — FR4
Andreoni A. — SE3
Andrianov K.Yu. — ThC4
Angelsky O.V. — WL3, WN5
Anikeev B.V. — FT27, ThM2
Anikeyev V.V. — ThM20, ThP3
Anikin K.V. — ThN23
Antipov O.L. — FA2, FJ1, FP14, FP26, SD5
Antsygin V.D. — FP4
Anufrik A. — ThN26
Anufrik S. — FS29
Apanasevich P.A. — FL1, ThM45, ThM48, WE5
Apanasevich S.P. — ThP10, ThP11, WJ3
Apanasovich V.V. — FS30
Apolonsky A.A. — FQ2
Arakelian S.M. — FD2, SP7, ThO17
Archireev V. — ThM16
Armstrong R.L. — WK5
Arshinov K.I. — WX7
Artemyev M.V. — ThG2, WU29, WU33
Arzberger M. — FM2
Ashraf M.M. — FI5
Aslanyan L.S. — FT1, WY7
Astafieva L.G. — FS25, WX11
Atature M. — WC1
Atutov S.N. — ThJ2
Audretsch J. — FD6

Babin A.A. — SH2, SQ2
Babina N.A. — SH2
Babushkin I. — FO1
Badikov V.V. — WY21
Bagayev S.N. — FP25, ThE2, ThP17, WA2, WB1, WB3, WB4, WG2, WS2, WT2, WT7
Bagratashvili V.N. — FS27, ThN15, WD3
Bahari A. — FQ5
Baillagreon J.N. — FS14
Baitimbetova B.A. — WU11
Bakharev D.Yu. — ThM2
Bakhramov S.A. — ThN2, WY32
Bakhtin M.A. — ThM19
Bakin A.S. — WU21
Baklanov E.V. — SK1
Balachninaite O. — FL4, FP13
Balakin A.V. — FB6, WF1
Balle S. — FJ5, FO2
Baltuska A. — FH1
Bandrauk A.D. — SL1
Banishev A.F. — WU2, WY38
Baranov D.V. — WL5
Baranova I.M. — FS3
Baraulya V.I. — ThE2
Barille R. — WS4
Barkauskas M. — FP13
Barkou S.E. — WA4
Barland S. — FO2
Barnett S.M. — ThO4
Barnik M.I. — FK1
Barton P. — WM4
Barty C.P. — SQ1
Barun V.V. — WN6
Baryshnikov V.I. — FR13
Basharov A.M. — ThO3, WU7
Basiev T.T. — FF5
Batay L.E. — FT9, WX1
Baumann W. — ThN28, WE7
Bazylenko V.A. — WU20
Becker W. — ThF1
Bednarkiewicz A. — WJ1
Begishev I.A. — FM5
Beloglazov V.I. — WA2, WB4
Belousov V.P. — FP19
Belousov Yu.I. — FS9
Belousova I.M. — FF1, FP19
Belsley M. — ThM23, ThM26, ThM28
Belyaev V.S. — WJ5
Belyi V.N. — FB3, FT13, ThM39, ThM42
Benfield R.E. — FA2
Benkö G. — FH4
Bennemann K.H. — ThK5
Berardi V. — WM3
Beril S.I. — WY3
Berkovsky A.N. — ThM19
Bernal J.J.S. — ThM12
Berndt O. — SuB5
Bertel' I.M. — WX5
Bertolotti M. — WU18
Bertreux J.C. — FO3
Bertsev V.V. — ThM10
Besnard P. — FO3
Besogonov V.V. — FQ3
Bespalov V.G. — FC4, ThM30, ThN12
Bhat N. — FK3
Biancalana V. — FD7, ThJ2
Bijsenbaev M.A. — WU11
Bityurin N.M. — SH2
Björk G. — WM5, WR2
Blatt R. — WM4
Blinova K.G. — FS19, FS6
Bloch D. — ThE1
Blokhin A.P. — WX14, WX19
Blome Ch. — SQ1
Boardman A.D. — FJ2
Bobrov D.N. — FP21
Bocharov V.N. — ThM10
Bogdanov A.A. — SI6, WY11
Bogdanovich P.M. — FB2
Bogumirsky O.B. — ThM21
Bogusławskiy A.E. — WY20
Böhm G. — FM2
Bohórquez J. — FR3
Bokhonov A.F. — WU31
Bolotov V.V. — WU4
Bolshakov M.V. — ThM14, ThP3
Bonch-Bruevich A.M. — FD4, WK4
Bondani M. — SE3
Bondar A.M. — WY29
Bondar I.I. — WY33, WY34
Bondarev S.L. — FP21
Bonert A.E. — ThE2
Borghs G. — ThK3
Borisevich N.A. — WI2, WX19
Borisov V.I. — ThP14
Borodin M.V. — ThM29
Borysov R.S. — ThK6
Boyarkin O.V. — ThI4
Boychuk I.V. — FS23, SK6, ThN23
Bozhevolnyi S.I. — ThB2, WV8
Brabec T. — FM1, SB4
Brambilla M. — SJ3
Brandt N.B. — WS5
Brandt N.N. — ThN36, WS5
Brembs K. — ThD4
Brocklesby W. — WK2
Brodyn M. — FK4
Broeng J. — WA4
Brunel M. — SI2
Bryuhanov V.V. — ThN6
Brzhasovskiy Yu.V. — WY20
Bufetov I.A. — FB1
Bufetova G.A. — FT31
Buganov O.V. — WX13, WX19
Buj A.A. — WE5
Bukin O.A. — WY12
Bunkin A.F. — SP6
Burakov V.S. — FS30, WU31
Burchianti A. — FD7, ThJ2
Burikov S.A. — ThN24
Burkovets D.N. — WN5
Burlakov A.V. — FI4, WC3
Burtsev A.P. — ThM10, WY19

Key to Authors

Bushuev V.A. — FB6, ThM34
Bushuk B.A. — FA2, ThI7, WX17
Bushuk S.B. — ThI7, WX17
Butcher R.J. — WB2
Butkus R. — FL5
Buyarov S.A. — FL6
Buzelis R. — ThH3
Bychkov S.S. — ThI1
Bykov I. — FP16

Calabrese R. — ThJ2
Calarco T. — FN2
Camacho A.S.— FR3
Canioni L. — WS4
Capasso F. — FS14
Carcía-Ojalvo J. — FE3
Cartaleva S. — FD7
Causa F. — FT15
Cavalleri A. — SQ1
Cerullo G. — ThM22
Cervantes M.A. — FR5
Chalov V.N. — ThN14, WD4
Chalykh R.A. — FQ13
Chardonnet Ch. — WB2
Chari R. — FR10
Chartier T. — SI2
Chausov D.V. — FJ1
Chekalin S.V. — FH5, FR4
Chekhonin I.A. — ThP17, WT2
Chekhonin M.A. — ThP17
Chekhov D.I. — ThN7
Chekhova M.V. — FI4, WC3, WM3
Chekina S.N. — FT24
Chelkowski S. — SL1
Chepurov S.V. — WB4
Cherkas N.L. — WY36
Cherkasova O.P. — ThN38
Chernyavskaya E.A. — SF5
Chernyavsky V.A. — FS26
Chervyakov A.V. — WU14
Chesnokov S.S. — FT26
Chichigina O.A. — WY40
Chigarev N.V. — SP4, WU12, WU22
Chikishev A.Yu. — ThN19, ThN36, WS5
Chilingaryan Yu.S. — WY6
Chin S.L. — ThC4
Chirkin A.S. — FI2
Chirkov V.V. — ThM13
Chirvony V.S. — ThN21, ThN29, ThN33, WI3
Chistyakov A.A. — FS13, WY45
Chizhevsky V.N. — SI4
Chizhova G.A. — FT30
Cho A.Y. — FS14
Choi S.S. — SO3
Chorvat D. — WA2
Chorvat D., Jr. — WA2
Chudinov V.G. — FQ3
Chudoba C. — WN1
Chugunov V. — WV3
Chulkov R.V. — FT13, ThM49
Churakov V.V. — FB5, WX3, WX5, WY42
Churina I.V. — SK6
Churmakov D.Yu. — FQ2
Chutko O.V. — FQ10, FQ9
Cipriani R.— FS1
Cirac J.I. — FN2
Colet P. — FT33, FT34, FT35, ThO4
Corovai A.V. — FS5
Corradi L. — ThJ2
Coufal H.J. — SE1
Coullet P. — FO2
Criado A. — FK5
Cundiff S.T. — FM2

D'Arice M.— FS1
D'yakov V.A.— FF4
Dainelli A. — ThJ2
Danailov M.B. — FT9, WJ1
Dancheva Y. — FD7
Daniel M. — ThM17
Danilov O.B. — FF1, FP19
Danilov V.V. — FP19
Dashevsky O.Yu. — FP4
Davliatchine E.M. — WT2
De Dominicis L. — SA4
de Matos Gomes E. — FK5
De Silvestri S. — ThM22
Deinekina N.A. — FP7
Delgado J. — ThE4
Demchenko N.N. — WT8
Dement'ev A. — ThH3
Dement'ev D.A. — FR4
Demidovich A.A. — FT9, WJ1
Denisov I.A. — FP22
Denisyuk Yu.N. — SE3
Derbov V.L. — ThO9
Derevyanko N.A. — FR9
Deykoon A.M. — ThM6
Dharmaprakash S.M. — FK3
Di Giuseppe G. — WC1
Diener J. — WU17
Diening A. — FM3
Dietrich C. — SQ1
Dittrich Th. — FK4
Dmitriev A.K. — WB3
Dmitriev V.G. — FA1, TuB3, FK2
Dmitriev V.J. — ThP17
Dmitriyev A.K. — WB4
Dobryakov A.L. — SC1, SC3
Dobryakov V.V. — ThN5
Doktorov E.V. — ThM37
Dokutovich A.A. — ThP10, ThP11
Dolenko S.A. — SK6
Dolenko T.A. — FS23, SK6, ThN23
Dolgova T.V. — WF2, WU19
Domrachev G.A. — FA2, FP14
Dörner R. — SG2
Douglas W.E. — FA2, FP14
Drabovich K.N. — WV4
Drachev V.P. — WK5, WP4
Dreier T. — FS10, FS15
Drexler W. — WN1
Dronov S.A. — FT27
Duboshevskii S.Yu. — WY3
Dubovsky V.L. — WX19
Dubrov V.D. — FL6
Ducloy M. — ThE1
Duzhko V. — FK4
Dychkov A.S. — WB4
Dymshits O.S. — FP22
Dynich R.A. — WU15
Dzhagarov B.M. — ThN22, WS1
Dzhidzhoev M.S. — FQ9

Eckardt R.C. — FL4
Edamatsu K. — ThB1
Efendiev T.Sh. — ThP9, WX18
Efimova A.I. — WU16
Efremov M.D. — WU4
Egorov O.A. — ThM31
Egorov V.S. — ThP17, WT2
Egorova A.B. — ThN10
Eichler H.J. — WE5, WJ1
Elbakyan E.L. — FT1
Elizarov S.G. — WV5
Emel'yanov V.I. — FR12, SH4, WK2, WY44
Entin V.M. — WY20
Epikhine E.N. — WV10
Eremeykin O.N. — FP26
Eriomin K.I. — WU3
Ermolaeva G.M. — WY17
Ermolenkov V.V. — ThM49, ThN35
Ernsting N.P. — SC3
Erokhovets V.K. — ThP12
Eschner J. — WM4
Esman A.K. — ThP4, ThP5
Evtyukhov K.N. — FS3

Fadeev V.V. — FS23, SK6, ThN23, ThN24
Fang H. — FG1
Fantoni R. — SA4
Fedina L.I. — WU4
Fedorov A.N. — WT2
Fedorov M.V. — SG3
Fedorov S.V. — FJ3
Fedorov V.I. — ThN38
Fedotov A.B. — FS20, SF4, WA2, WU17, WU22
Fedotov A.M. — ThF4
Fedotov V. — WK2
Fedotova O. — FS16, WY26
Fedotova O.M. — FG2
Fedyanin A.A. — WF2, WU19
Feigelson R.S. — FF6
Fel'de C.V. — SE5
Feldmann J. — FM2
Fernández J.J. — FE3
Ferrante G. — FQ12
Ficek Z. — ThO5
Fiebig M. — SP3
Filippov V.N. — SI3
Filippov V.V. — FP27
Firsov A.A. — ThP7
Firsov S.P. — FP27
Fischer P. — SP1
Fleck B. — FT4
Fleming R.D. — WN3
Flytzanis C. — ThB4
Font J.L. — FE3
Frey R. — ThB4
Friese M.E.J. — ThO5
Fröhlich D. — SP3
Frolova M.N. — ThM29
Fromager M. — FT19, FT38
Fujimoto J.G. — WN1
Fuss W. — ThI6
Gadomsky O.N. — WU5
Gadonas R. — ThM35
Gaida L. — ThM52
Gaiko O.L. — WX3
Galievsky V.A. — ThN21, ThN22
Galkin A.F. — SP7

Key to Authors

Galkin A.L. — SQ5
Galuskin M.G. — FL6
Gan'shina E. — FP16
Gancheryonok I.I. — FS10, FS15, FT4
Ganeev R.A. — FP1, FP2
Gangardt M.G. — WS5
Gaponenko S.V. — WF3, WX15, WU26
Gapontsev V.P. — WD3
Garanovich I.L. — ThM46
Garcia M.E. — SC4, ThK5
García-Ojalvo J. — FJ4
García-Ripoli J.J. — FD3
Gardiner S.A. — FD1
Gatalica Z. — WN3
Gatti A. — WC4
Gayvoronsky V. — FK4
Geiko L.G. — WY21, FP23
Geiko P.P. — WY21, FP23
Gelin M.F. — WX14, WX19
Gheri K.M. — FD1
Giammanco F. — SF4
Giammartini S. — FS1
Gibb J.S. — FS18
Giessen H. — SG2
Gildenburg V.B. — FQ6
Giorgi M. — SA4
Giovanetti V. — WH2
Giudici M. — FO2
Glas P. — FT21
Glorieux P. — SD1
Gmachl C. — FS14
Gnatyshchak V.I. — WU6
Goldina N.D. — FT29
Golik S.S. — WY12
Golishnikov D.M. — FQ8, FQ9
Golovan L.A. — WA2, WU16, WU17
Golovnin I.V. — WU1
Golovtsov N.I. — WV1
Golubev V.S. — FL6, WU2
Golubtsov I.S. — ThC2
Gomer V. — ThJ1
Gomila D. — FT33, FT34, FT35
Goncharenko A.M. — SJ2, ThM46, ThP10, WJ3
Goncharenko I.A. — ThP4, ThP5
Goncharov A.A. — FP17
Goncharov A.N. — ThE2
Gorbach D.M. — WY27
Gorbach D.V. — FG2
Gorbachev V.N. — ThO12
Gorbunkov M.V. — FT32
Gordienko V.M. — FQ10, FQ11, FQ8, FQ9, SuB4, TuB1, FF3
Gorobets V.A. — FB5, WX3
Goryachev V.A. — WY22
Grabtchikov A.S. — FL1, FT13, ThM49, WE5
Grain Ch. — WB2
Granovsky A. — FP16
Granpayeh N. — ThH6
Grasbon F. — SG1
Grashin P.S. — WN4
Grechin S.G.— FK2, FP23
Grechin S.S.— FF3, FF4
Grib A.F. — FS26
Gribkovskii V.P. — FT17
Gridchin V.V. — FQ7
Grigonis R. — FL4, FP13, FR9
Grigorenko I. — SC4
Grigorian G.G. — WY35
Grigorieva E.V. — FT7
Grigoryan G.G. — ThK6
Grigoryan J.Ch. — WY7
Grimm R. — ThJ3
Grinyov B.V. — ThK6
Grischchenko S.V. — FS22
Grishachev V.V. — FP3
Grishanin B.A. — FN4, FS2, ThI1, ThO14
Grishayev R.V. — FL6
Gritsai Yu.V. — ThM51
Grohovska T.E. — ThN15
Große Westhoff E. — SD2
Grushevskaya H. — WY43
Gruzdev V.E. — ThM32, WY30
Gubarevich A.V. — WU35
Gubarevich T.M. — WU35
Gubin M. — WG3
Gudelev V.G. — WX3, WX7
Guidi V. — ThJ2
Gulde S. — WM4
Gurin V.S. — WU32
Gurinovich L.I. — WU29
Gurov I. — FT22, ST1, WV3
Gurskii A.L. — WJ2, WU27
Guschin V. — FP16
Gutakovskii A.K. — WU4

Hakhoumian A.A. — FC5
Halilulayev G.M. — ThN3
Hammes M. — ThJ3
Hancock G. — FS18
Hänsch T.W. — WG1, WG2
Hanuza J. — WU23
Harkness G. — FT33
Hartl I. — WN1
Haus J.W. — WA3, WU18, WU22
Havey M.D. — WM2
Herbig J. — ThJ3
Hering P. — WD5
Heuken M. — WJ2, WU27
Hideur A. — SI2
Hilscher D. — SuB5
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Zubrik M.V. — ThM14
Zubrytski U.V. — ThM36
Zuikov V.A. — WY47
Zverev P.G. — FF5
Zych E. — WU23
Zykov A.L. — ThM18
Zyryanov V.Ya. — ThP8, WX6

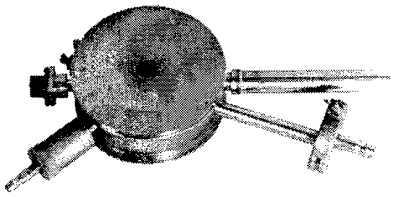
КРИОСТАТЫ

для научных исследований
из Института физики твердого тела РАН

RESEARCH CRYOSTATS

by the Institute of Solid State Physics
Russian Academy of Sciences

- Гелиевые и азотные криостаты
- Вставки к криостатам
- Уровнемеры для гелия и азота
- Терморегуляторы с компьютерным интерфейсом
- Дополнительное оборудование



Типы измерений

- Оптические
- Рентгеновские
- Электрические
- Магнитные
- Микроскопия и спектроскопия
- Механические

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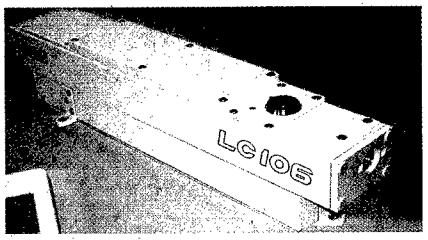
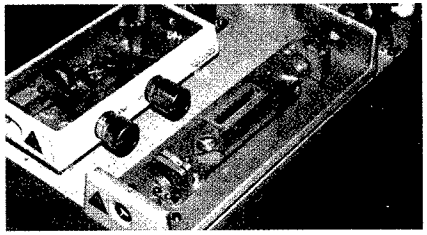
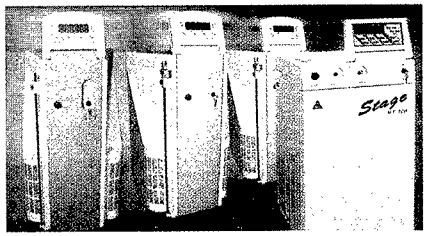
LASER SYSTEMS AND OPTICAL COMPONENTS

... from 200 nm up to 2200 nm







Nd:YAG Lasers for scientific applications

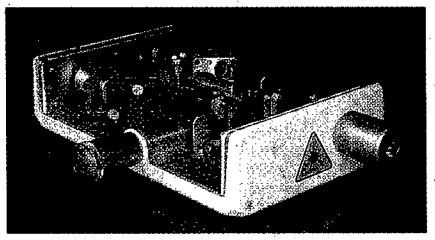
Tunable Lasers

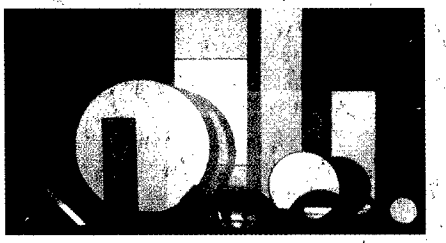
Nonlinear Converters

Medical Laser Systems

Industrial Laser Systems

High Power Optics and Crystals





SOLAR
LASER SYSTEMS

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